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## ABSTRACT

With this Career and Technology Studies (CTS) curriculum guide, secondary students in Alberta can do the following; develop skills that can be applied in their daily lives; refine career-planning skills; develop technology-related skills in construction; enhance employability skills, especially in construction industries; and apply and reinforce learning developed in other subject areas. The curriculum is organized in strands and modules. This guide encompassing the construction technologies strand contains 46 modules that define what a student is expected to know and be able to do (competencies). The guide is organized in the following parts: (1) program rationale and philosophy, learner expectations, program organization, curriculum and assessment standards, and types of competencies in career and technology studies; (2) strand rationale and philosophy and strand organization for construction technologies; (3) planning for instruction for career and technology studies and for construction technology courses; (4) module curriculum and assessment standards for introductory level construction technologies competencies; (5) module curriculum and assessment standards for intermediate level construction technologies competencies; (6) module curriculum and assessment standards for advanced level construction technologies competencies; (7) assessment tools; (8) linkages and transitions; (9) learning resource guide; and (10) sample student learning guides. Modules cover the following broad topics: tools and materials; building construction; project management; mold making and casting; site preparation; framing; roofs; exterior finishing; electrical, plumbing, and climate control systems; furniture making; cabinetmaking; concrete; masonry; wall and ceiling finishing; stairs; floorcovering; energy-efficient housing; renovations; and project and production management. (KC)



# CAREER & TECHNOLOGY STUDIES

## CONSTRUCTION TECHNOLOGIES

### GUIDE TO STANDARDS AND IMPLEMENTATION

1997

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This document supersedes all previous versions of the *Career & Technology Studies Guide to Standards and Implementation*.

This publication is a support document. The advice and direction offered is suggestive except where it duplicates the Program of Studies. The Program of Studies—a prescriptive description of the expectations of student learning, focusing on what students are expected to know and be able to do—is issued under the authority of the Minister of Education pursuant to section 25(1) of the *School Act*, Statutes of Alberta, 1988, Chapter S-3.1 as amended, and is required for implementation. **Within this document, the Program of Studies is shaded so that the reader may readily identify all prescriptive statements or segments.**

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# CAREER AND TECHNOLOGY STUDIES

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## A. PROGRAM RATIONALE AND PHILOSOPHY

Through Career and Technology Studies (CTS), secondary education in Alberta is responding to the many challenges of modern society, helping young people develop daily living skills and nurturing a flexible, well-qualified work force.

In Canada's information society, characterized by rapid change in the social and economic environment, students must be confident in their ability to respond to change and successfully meet the challenges they face in their own personal and work lives. In particular, they make decisions about what they will do when they finish high school. Many students will enter the work force, others will continue their education. All students face the challenges of growing independence and responsibility, and of entering post-secondary programs and/or the highly competitive workplace.

Secondary schools also face challenges. They must deliver, on a consistent basis, high quality, cost-effective programs that students, parents and the community find credible and relevant.

CTS helps schools and students meet these challenges. Schools can respond more efficiently and effectively to student and community needs and expectations by taking advantage of the opportunities in the CTS curriculum to design courses and access school, community and distance learning resources. Students can develop the confidence they need as they move into adult roles by assuming increased responsibility for their

learning; cultivating their individual talents, interests and abilities; and by defining and acting on their goals.

As an important component of education in Alberta secondary schools, CTS promotes student achievement by setting clear expectations and recognizing student success. Students in CTS develop competencies—the knowledge, skills and attitudes they are expected to demonstrate, that is, what they know and what they are able to do.

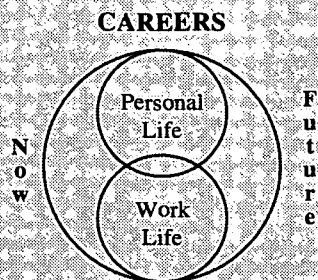
Acquired competencies can be applied now and in the future as students make a smooth transition into adult roles in the family, community, workplace and/or further education. To facilitate this transition, clearly stated expectations and standards have been defined in cooperation with teachers, business and industry representatives and post-secondary educators.

CTS offers all students important learning opportunities. Regardless of the particular area of study chosen, *students in CTS will:*

- develop skills that can be applied in their daily lives, now and in the future
- refine career-planning skills
- develop technology-related skills
- enhance employability skills
- apply and reinforce learnings developed in other subject areas.



In CTS, students build skills they can apply in their everyday lives. For example, in the CTS program, particularly at the introductory levels, students have the opportunity to improve their ability to make sound consumer decisions and to appreciate environmental and safety precautions.

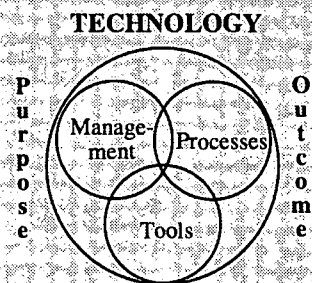


A career encompasses more than activities just related to a person's job or occupation; it involves one's personal life in both local and global contexts; e.g., as a family member, a friend, a community volunteer, a citizen of the world.

The integration of careers throughout the CTS program helps students to make effective career decisions and to target their efforts. CTS students will have the opportunity to expand their knowledge about careers, occupations and job opportunities, as well as the education and/or training requirements involved. Also, students come to recognize the need for lifelong learning.

Students in CTS have the opportunity to use and apply technology and systems effectively and efficiently. This involves:

- a decision regarding which processes and procedures best suit the task at hand
- the appropriate selection and skilled use of the tools and/or resources available
- an assessment of and management of the impact the use of the technology may have on themselves, on others and on the environment.



Integrated throughout CTS are employability skills, those basic competencies that help students develop their personal management and social skills. Personal management skills are improved as students take increased responsibility for their learning, design innovative solutions to problems and challenges, and manage resources effectively and efficiently. Social skills improve through learning experiences that require students to work effectively with others, demonstrate teamwork and leadership, and maintain high standards in safety and accountability.

As well as honing employability skills, CTS reinforces and enhances learnings developed in core and other complementary courses. The curriculum emphasizes, as appropriate, the effective application of communication and numeracy skills.

In addition to the common outcomes described above, students focusing on a particular area of study will develop career-specific competencies that support entry into the workplace and/or related post-secondary programs. Career-specific competencies can involve understanding and applying appropriate terminology, processes and technologies related to a specific career, occupation or job.



## GENERAL LEARNER EXPECTATIONS

General learner expectations describe the basic competencies integrated throughout the CTS program.

Within an applied context relevant to personal goals, aptitudes and abilities; *the student* in CTS will:

- demonstrate the basic knowledge, skills and attitudes necessary for achievement and fulfillment in personal life
- develop an action plan that relates personal interests, abilities and aptitudes to career opportunities and requirements
- use technology effectively to link and apply appropriate tools, management and processes to produce a desired outcome
- develop basic competencies (employability skills), by:
  - selecting relevant, goal-related activities, ranking them in order of importance, allocating necessary time, and preparing and following schedules (managing learning)
  - linking theory and practice, using resources, tools, technology and processes responsibly and efficiently (managing resources)
  - applying effective and innovative decision-making and problem-solving strategies in the design, production, marketing and consumption of goods and services (problem solving and innovation)
  - demonstrating appropriate written and verbal skills, such as composition, summarization and presentation (communicating effectively)
  - participating as a team member by working cooperatively with others and contributing to the group with ideas, suggestions and effort (working with others)

- maintaining high standards of ethics, diligence, attendance and punctuality, following safe procedures consistently, and recognizing and eliminating potential hazards (demonstrating responsibility).

## PROGRAM ORGANIZATION

### CURRICULUM STRUCTURE

Career and Technology Studies is organized into **strands** and **modules**.

**Strands** in CTS define competencies that help students:

- build daily living skills
- investigate career options
- use technology (managing, processes, tools) effectively and efficiently
- prepare for entry into the workplace and/or related post-secondary programs.

In general, strands relate to selected industry sectors offering positive occupational opportunities for students. Some occupational opportunities require further education after high school, and some allow direct entry into the workplace. Industry sectors encompass goods-producing industries, such as agriculture, manufacturing and construction; and service-producing industries, such as business, health, finance and insurance.

**Modules** are the building blocks for each strand. They define what a student is expected to know and be able to do (exit-level *competencies*). Modules also specify prerequisites. Recommendations for module parameters, such as instructional qualifications, facilities and equipment can be found in the guides to implementation.

The competencies a student must demonstrate to achieve success in a module are defined through the *module learner expectations*. Senior high school students who can demonstrate the module learner expectations; i.e., who have the designated competencies, will qualify for one credit toward their high school diploma.



*Specific learner expectations* provide a more detailed framework for instruction. Within the context of module learner expectations, the specific learner expectations further define the knowledge, skills and attitudes the student should acquire.

The following chart shows the 22 strands that comprise the CTS program and the number of modules available in each strand.

Strand	No. of Modules
1. Agriculture	33
2. Career Transitions	28
3. Communication Technology	33
4. Community Health	31
5. Construction Technologies	46
6. Cosmetology	58
7. Design Studies	31
8. Electro-Technologies	37
9. Energy and Mines	26
10. Enterprise and Innovation	8
11. Fabrication Studies	41
12. Fashion Studies	29
13. Financial Management	14
14. Foods	37
15. Forestry	21
16. Information Processing	48
17. Legal Studies	13
18. Logistics	12
19. Management and Marketing	19
20. Mechanics	54
21. Tourism Studies	24
22. Wildlife	17

## LEVELS OF ACHIEVEMENT

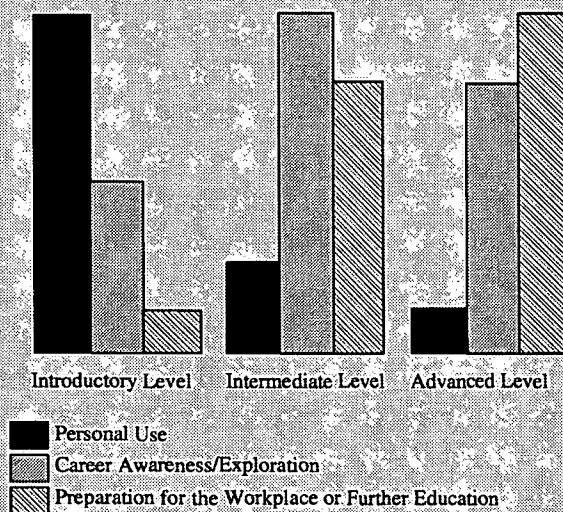
Modules are organized into three levels of achievement: **introductory**, **intermediate** and **advanced**. As students progress through the levels, they will be expected to meet higher standards and demonstrate an increased degree of competence, in both the general learner expectations and the module learner expectations.

**Introductory** level modules help students build daily living skills and form the basis for further learning. Introductory modules are for students who have no previous experience in the strand.

**Intermediate** level modules build on the competencies developed at the introductory level. They provide a broader perspective, helping students recognize the wide range of related career opportunities available within the strand.

**Advanced** level modules refine expertise and help prepare students for entry into the workplace or a related post-secondary program.

The graph below illustrates the relative emphasis on the aspects of career planning at each of the levels.





## CURRICULUM AND ASSESSMENT STANDARDS

**Curriculum standards** in CTS define what students must know and be able to do. Curriculum standards are expressed through general learner expectations for CTS, and through module and specific learner expectations for each strand.

**Assessment standards** define how student performance is to be judged. In CTS, each assessment standard defines the conditions and criteria to be used for assessing the competencies of each module learner expectation. To receive credit for a module, students must demonstrate competency at the level specified by the conditions and criteria defined for each module learner expectation.

Students throughout the province receive a fair and reliable assessment as they use the standards to guide their efforts, thus ensuring they participate more effectively and successfully in the learning and assessment process. Standards at advanced levels are, as much as possible, linked to workplace and post-secondary entry-level requirements.

## TYPES OF COMPETENCIES

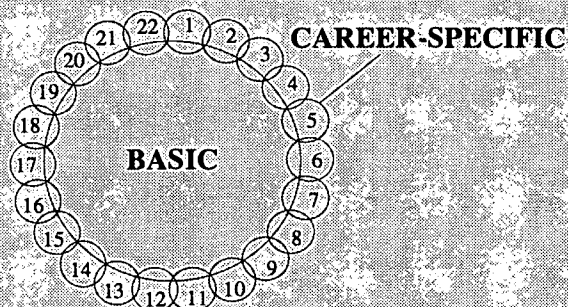
Two types of competencies are defined within the CTS program: basic and career-specific.

**Basic** competencies are generic to any career area and are developed within each module. Basic competencies include:

- personal management; e.g., managing learning, being innovative, ethics, managing resources
- social; e.g., communication, teamwork, leadership and service, demonstrating responsibility (safety and accountability).

**Career-specific** competencies relate to a particular strand. These competencies build daily living skills at the introductory levels and support the smooth transition to the workplace and/or post-secondary programs at the intermediate and advanced levels.

The model below shows the relationship of the two types of competencies within the 22 strands of the CTS program.








## BASIC COMPETENCIES REFERENCE GUIDE

The chart below outlines basic competencies that students endeavour to develop and enhance in each of the CTS strands and modules. Students' basic competencies should be assessed through observations involving the student, teacher(s), peers and others as they complete the requirements for each module. In general, there is a progression of task complexity and student initiative as outlined in the Developmental Framework\*. As students progress through Stages 1, 2, 3 and 4 of this reference guide, they build on the competencies gained in earlier stages. Students leaving high school should set themselves a goal of being able to demonstrate Stage 3 performance.

*Suggested strategies for classroom use include:*

- having students rate themselves and each other
- using in reflective conversation between teacher and student
- highlighting areas of strength
- tracking growth in various CTS strands
- highlighting areas upon which to focus
- maintaining a student portfolio.

Stage 1— The student:	Stage 2— The student:	Stage 3— The student:	Stage 4— The student:
<b>Managing Learning</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> comes to class prepared for learning</li> <li><input type="checkbox"/> follows basic instructions, as directed</li> <li><input type="checkbox"/> acquires specialized knowledge, skills and attitudes</li> <li><input type="checkbox"/> identifies criteria for evaluating choices and making decisions</li> <li><input type="checkbox"/> uses a variety of learning strategies</li> </ul>	 <ul style="list-style-type: none"> <li><input type="checkbox"/> follows instructions, with limited direction</li> <li><input type="checkbox"/> sets goals and establishes steps to achieve them, with direction</li> <li><input type="checkbox"/> applies specialized knowledge, skills and attitudes in practical situations</li> <li><input type="checkbox"/> identifies and applies a range of effective strategies for solving problems and making decisions</li> <li><input type="checkbox"/> explores and uses a variety of learning strategies, with limited direction</li> </ul>	 <ul style="list-style-type: none"> <li><input type="checkbox"/> follows detailed instructions on an independent basis</li> <li><input type="checkbox"/> sets clear goals and establishes steps to achieve them</li> <li><input type="checkbox"/> transfers and applies specialized knowledge, skills and attitudes in a variety of situations</li> <li><input type="checkbox"/> uses a range of critical thinking skills to evaluate situations, solve problems and make decisions</li> <li><input type="checkbox"/> selects and uses effective learning strategies</li> <li><input type="checkbox"/> cooperates with others in the effective use of learning strategies</li> </ul>	 <ul style="list-style-type: none"> <li><input type="checkbox"/> demonstrates self-direction in learning, goal setting and goal achievement</li> <li><input type="checkbox"/> transfers and applies learning in new situations; demonstrates commitment to lifelong learning</li> <li><input type="checkbox"/> thinks critically and acts logically to evaluate situations, solve problems and make decisions</li> <li><input type="checkbox"/> provides leadership in the effective use of learning strategies</li> </ul>
<b>Managing Resources</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> adheres to established timelines; uses time/schedules/planners effectively</li> <li><input type="checkbox"/> uses information (material and human resources), as directed</li> <li><input type="checkbox"/> uses technology (facilities, equipment, supplies), as directed, to perform a task or provide a service</li> <li><input type="checkbox"/> maintains, stores and/or disposes of equipment and materials, as directed</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> creates and adheres to timelines, with limited direction; uses time/schedules/planners effectively</li> <li><input type="checkbox"/> accesses and uses a range of relevant information (material and human resources), with limited direction</li> <li><input type="checkbox"/> uses technology (facilities, equipment, supplies), as appropriate, to perform a task or provide a service, with minimal assistance and supervision</li> <li><input type="checkbox"/> maintains, stores and/or disposes of equipment and materials, with limited assistance</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> creates and adheres to detailed timelines on an independent basis; prioritizes task; uses time/schedules/planners effectively</li> <li><input type="checkbox"/> accesses a range of information (material and human resources), and recognizes when additional resources are required</li> <li><input type="checkbox"/> selects and uses appropriate technology (facilities, equipment, supplies) to perform a task or provide a service on an independent basis</li> <li><input type="checkbox"/> maintains, stores and/or disposes of equipment and materials on an independent basis</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> creates and adheres to detailed timelines; uses time/schedules/planners effectively; prioritizes tasks on a consistent basis</li> <li><input type="checkbox"/> uses a wide range of information (material and human resources) in order to support and enhance the basic requirement</li> <li><input type="checkbox"/> recognizes the monetary and intrinsic value of managing technology (facilities, equipment, supplies)</li> <li><input type="checkbox"/> demonstrates effective techniques for managing facilities, equipment and supplies</li> </ul>
<b>Problem Solving and Innovation</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> participates in problem solving as a process</li> <li><input type="checkbox"/> learns a range of problem-solving skills and approaches</li> <li><input type="checkbox"/> practices problem-solving skills by responding appropriately to a clearly defined problem, specified goals and constraints, by: <ul style="list-style-type: none"> <li>— generating alternatives</li> <li>— evaluating alternatives</li> <li>— selecting appropriate alternative(s)</li> <li>— taking action</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> identifies the problem and selects an appropriate problem-solving approach, responding appropriately to specified goals and constraints</li> <li><input type="checkbox"/> applies problem-solving skills to a directed or a self-directed activity, by: <ul style="list-style-type: none"> <li>— generating alternatives</li> <li>— evaluating alternatives</li> <li>— selecting appropriate alternative(s)</li> <li>— taking action</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> thinks critically and acts logically in the context of problem solving</li> <li><input type="checkbox"/> transfers problem-solving skills to real-life situations, by generating new possibilities</li> <li><input type="checkbox"/> prepares implementation plans</li> <li><input type="checkbox"/> recognizes risks</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> identifies and resolves problems efficiently and effectively</li> <li><input type="checkbox"/> identifies and suggests new ideas to get the job done creatively, by: <ul style="list-style-type: none"> <li>— combining ideas or information in new ways</li> <li>— making connections among seemingly unrelated ideas</li> <li>— seeking out opportunities in an active manner</li> </ul> </li> </ul>



Stage 1— The student:	Stage 2— The student:	Stage 3— The student:	Stage 4— The student:
<b>Communicating Effectively</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> uses communication skills; e.g., reading, writing, illustrating, speaking</li> <li><input type="checkbox"/> uses language in appropriate context</li> <li><input type="checkbox"/> listens to understand and learn</li> <li><input type="checkbox"/> demonstrates positive interpersonal skills in selected contexts</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> communicates thoughts, feelings and ideas to justify or challenge a position, using written, oral and/or visual means</li> <li><input type="checkbox"/> uses technical language appropriately</li> <li><input type="checkbox"/> listens and responds to understand and learn</li> <li><input type="checkbox"/> demonstrates positive interpersonal skills in many contexts</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> prepares and effectively presents accurate, concise, written, visual and/or oral reports providing reasoned arguments</li> <li><input type="checkbox"/> encourages, persuades, convinces or otherwise motivates individuals</li> <li><input type="checkbox"/> listens and responds to understand, learn and teach</li> <li><input type="checkbox"/> demonstrates positive interpersonal skills in most contexts</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> negotiates effectively, by working toward an agreement that may involve exchanging specific resources or resolving divergent interests</li> <li><input type="checkbox"/> negotiates and works toward a consensus</li> <li><input type="checkbox"/> listens and responds to understand, learn, teach and evaluate</li> <li><input type="checkbox"/> promotes positive interpersonal skills among others</li> </ul>
<b>Working with Others</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> fulfills responsibility in a group project</li> <li><input type="checkbox"/> works collaboratively in structured situations with peer members</li> <li><input type="checkbox"/> acknowledges the opinions and contributions of others in the group</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> </li> <li><input type="checkbox"/> cooperates to achieve group results</li> <li><input type="checkbox"/> maintains a balance between speaking, listening and responding in group discussions</li> <li><input type="checkbox"/> respects the feelings and views of others</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> seeks a team approach, as appropriate, based on group needs and benefits; e.g., idea potential, variety of strengths, sharing of workload</li> <li><input type="checkbox"/> works in a team or group: <ul style="list-style-type: none"> <li>– encourages and supports team members</li> <li>– helps others in a positive manner</li> <li>– provides leadership/ followership as required</li> <li>– negotiates and works toward consensus as required</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> leads, where appropriate, mobilizing the group for high performance</li> <li><input type="checkbox"/> understands and works within the context of the group</li> <li><input type="checkbox"/> prepares, validates and implements plans that reveal new possibilities</li> </ul>
<b>Demonstrating Responsibility</b> <p><b>Attendance</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> demonstrates responsibility in attendance, punctuality and task completion</li> </ul> <p><b>Safety</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> follows personal and environmental health and safety procedures</li> <li><input type="checkbox"/> identifies immediate hazards and their impact on self, others and the environment</li> <li><input type="checkbox"/> follows appropriate/emergency response procedures</li> </ul> <p><b>Ethics</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> makes personal judgements about whether or not certain behaviours/actions are right or wrong</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> </li> <li><input type="checkbox"/> recognizes and follows personal and environmental health and safety procedures</li> <li><input type="checkbox"/> identifies immediate and potential hazards and their impact on self, others and the environment</li> <li><input type="checkbox"/> </li> <li><input type="checkbox"/> assesses how personal judgements affect other peer members and/or family; e.g., home and school</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> </li> <li><input type="checkbox"/> establishes and follows personal and environmental health and safety procedures</li> <li><input type="checkbox"/> </li> <li><input type="checkbox"/> </li> <li><input type="checkbox"/> assesses the implications of personal/group actions within the broader community; e.g., workplace</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> </li> <li><input type="checkbox"/> transfers and applies personal and environmental health and safety procedures to a variety of environments and situations</li> <li><input type="checkbox"/> </li> <li><input type="checkbox"/> </li> <li><input type="checkbox"/> demonstrates accountability for actions taken to address immediate and potential hazards</li> <li><input type="checkbox"/> analyzes the implications of personal/group actions within the global context</li> <li><input type="checkbox"/> states and defends a personal code of ethics as required</li> </ul>
<b>★ Developmental Framework</b> <ul style="list-style-type: none"> <li>• Simple task</li> <li>• Structured environment</li> <li>• Directed learning</li> </ul>	<ul style="list-style-type: none"> <li>• Task with limited variables</li> <li>• Less structured environment</li> <li>• Limited direction</li> </ul>	<ul style="list-style-type: none"> <li>• Task with multiple variables</li> <li>• Flexible environment</li> <li>• Self-directed learning, seeking assistance as required</li> </ul>	<ul style="list-style-type: none"> <li>• Complex task</li> <li>• Open environment</li> <li>• Self-directed/self-motivated</li> </ul>



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# CONSTRUCTION TECHNOLOGIES

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## B. STRAND RATIONALE AND PHILOSOPHY

The products of construction and manufacturing are a reflection of the needs and wants of society. For centuries, people have built structures and made objects to provide protection from the elements, to make work easier and to make life more enjoyable.

Today, our social and economic well-being is still closely linked to our ability to transform materials into useful products. Therefore, it is important that as students prepare for their futures, they should understand how the construction and manufacturing industries organize themselves and apply technology in productive ways.

In Alberta, the construction and manufacturing sectors of the economy are characterized by relatively small entrepreneurial businesses that make products for domestic and foreign market needs.

In recent years, dramatic changes have occurred in the way buildings and other products have been designed and built. With the aid of new techniques, architects and engineers are now able to simulate and evaluate designs with extreme accuracy. This precision translates into stronger structures, smaller tolerances, less waste and the need for a highly trained and flexible work force.

Construction Technologies, a strand in Career and Technology Studies, has been developed to help

meet this educational need. Students selecting modules from this strand have the opportunity to investigate and develop important knowledge, skills and attitudes relative to the design, construction and maintenance of buildings and other related products.

Students are provided with a broad base of relevant theory and practice that builds daily-living and career-specific skills. Successful completion of modules in this strand is intended to provide students with the skills and experience required for entry-level employment or for pursuing post-secondary education. This preparation is accomplished by encouraging students to:

- develop safe work and environmental practices
- develop self and resource management skills
- work with a variety of technologies and technological systems
- communicate and work as effective team members
- develop ethical work habits and relationships
- creatively seek practical solutions to problems



- develop consumer and life skills
- identify further educational and career opportunities.

Within the philosophy of Career and Technology Studies, *students* in Construction Technologies will:

- appreciate the importance of the construction and manufacturing industries in relationship to our personal, social and economic well-being
- demonstrate a working knowledge of materials, tools and processes that are used to create buildings and other related products that meet the needs and wants of society
- apply effective and responsible decision-making skills in the design and construction of buildings and durable goods
- develop positive attitudes toward individual and team work responsibilities, quality production and service
- develop an appreciation for health, safety and environmental issues related to construction and manufacturing
- appreciate the need for legislation and codes that regulate building construction and manufacturing activities
- link, in meaningful and practical ways, the knowledge, skills and attitudes developed in other strands and courses to this strand
- assess personal interests and abilities related to making realistic career choices.



## STRAND ORGANIZATION

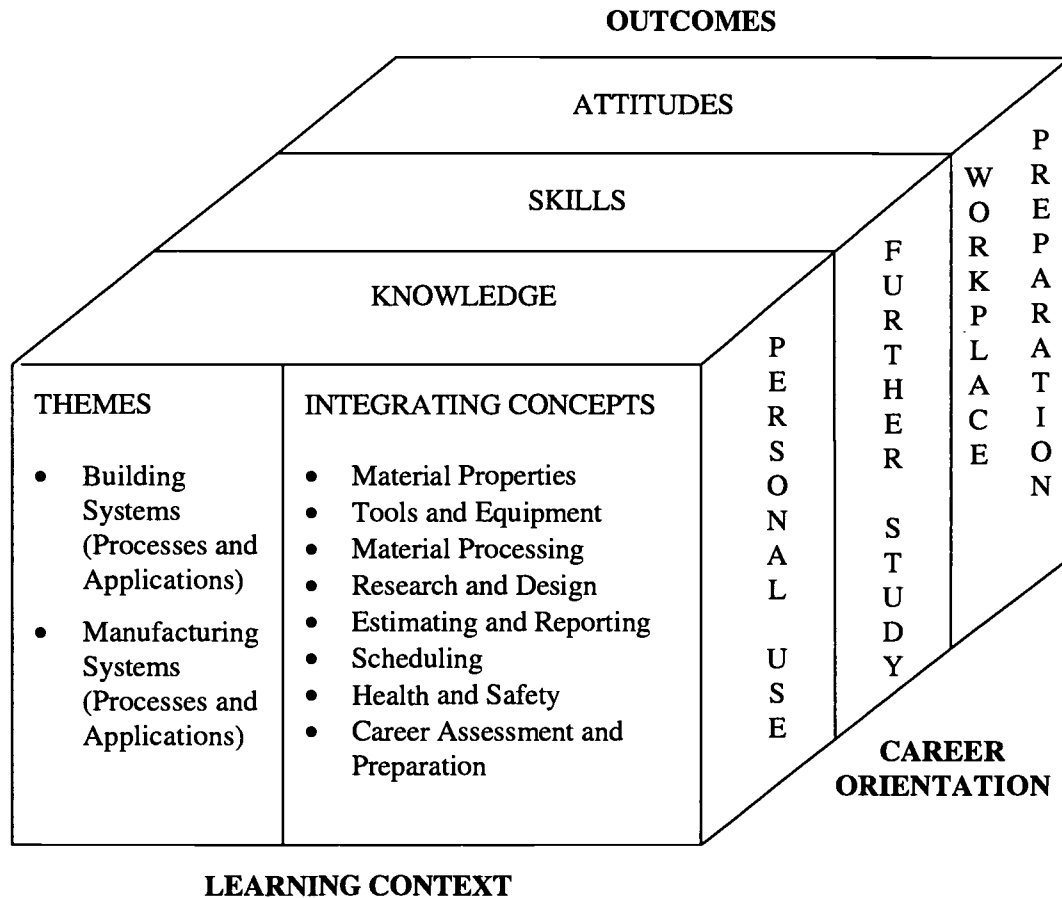
### THEMES

The Construction Technologies model, shown below, has been developed around two themes that are central to the transformation of material into useful products and structures. These themes are:

- Building Systems (Processes and Applications)
- Manufacturing Systems (Processes and Applications).

Integrating concepts, shown on the model, provide a basic framework for the study of each module.

The context in which the learning takes place varies according to the available resources, background experience and intent of the learner. As the student is engaged in the learning activities in the school or in the community, specific outcomes are anticipated. These outcomes take the form of basic and career-specific knowledge, skills and attitudes that have been constructed by the learner.





# SCOPE AND SEQUENCE

# CONSTRUCTION TECHNOLOGIES

INTRODUCTORY	INTERMEDIATE	ADVANCED	THEME
<div>Basic Tools &amp; Materials <sup>★†</sup> CON1010</div> <div>Building Construction CON1070</div>	<div>Site Preparation CON2010</div> <div>Concrete Forming CON2020</div> <div>Alternate Foundations CON2030</div> <div>Framing Systems 1 (Floor &amp; Wall) CON2040</div> <div>Roof Structures 1 (Framing &amp; Finishing) CON2050</div> <div>Exterior Finishing (Door, Window &amp; Siding) CON2060</div> <div>Electrical Systems CON2070</div> <div>Plumbing Systems CON2080</div> <div>Climate Control Systems CON2090</div> <div>Agri-structures CON2100</div>	<div>Concrete Work <sup>◆</sup> (Structures &amp; Finishes) CON3010</div> <div>Masonry Work <sup>◆</sup> (Structures &amp; Finishes) CON3020</div> <div>Framing Systems 2 (Floor, Wall &amp; Ceiling) CON3210</div> <div>Stair Construction <sup>◆</sup> CON3040</div> <div>Roof Structures 2 (Framing &amp; Covering) CON3050</div> <div>Wall &amp; Ceiling Finishing <sup>◆</sup> CON3030</div> <div>Doors &amp; Trim <sup>◆</sup> CON3060</div> <div>Floorcovering <sup>◆</sup> CON3070</div> <div>Energy-efficient Housing <sup>◆</sup> CON3080</div> <div>Renovations/Restorations <sup>◆</sup> CON3090</div> <div>Commercial Structures <sup>◆</sup> CON3100</div> <div>Site Management <sup>◆</sup> CON3110</div>	Building Systems (Processes and Applications)
<div>Project Management <sup>★◆</sup> CON1120</div> <div>Solid Stock Construction <sup>◆</sup> CON1130</div> <div>Turning Operations <sup>◆</sup> CON1140</div> <div>Manufactured Materials <sup>◆</sup> CON1160</div> <div>Mold Making &amp; Casting <sup>◆</sup> CON1180</div>	<div>Multiple Materials CON2120</div> <div>Furniture Making 1 (Box Construction) CON2130</div> <div>Furniture Making 2 (Frame &amp; Panel) CON2140</div> <div>Finishing &amp; Refinishing <sup>◆</sup> CON2150</div> <div>Cabinetmaking 1 (Web &amp; Face Frame) CON2160</div> <div>Cabinetmaking 2 (Door &amp; Drawer) CON2170</div> <div>Wood Forming CON2180</div> <div>Manufacturing Systems CON2190</div> <div>Product Development <sup>◆</sup> CON2200</div>	<div>Tool Maintenance <sup>◆</sup> CON3120</div> <div>Furniture Making 3 <sup>◆</sup> (Leg &amp; Rail) CON3130</div> <div>Furniture Making 4 <sup>◆</sup> (Surface Enhancement) CON3140</div> <div>Furniture Repair <sup>◆</sup> CON3150</div> <div>Cabinetmaking 3 <sup>◆</sup> (Cabinets/Countertops) CON3160</div> <div>Cabinetmaking 4 <sup>◆</sup> (Layout &amp; Installation) CON3170</div> <div>Production Planning CON3190</div> <div>Production Management CON3200</div>	Manufacturing Systems (Processes and Applications)

— Prerequisite

- - - - Recommended sequence

★ Module provides a strong foundation for further learning in this strand.

† Module is also offered in Fabrication Studies.

◆ Refer to specific modules for additional prerequisites.



## MODULE DESCRIPTIONS

### **Module CFS1010: Basic Tools & Materials**

Students develop basic hand tool and production skills to transform, safely, common building materials into useful products.

### **Module CON1070: Building Construction**

Students examine common building systems, and develop basic skills related to building a simple model or full size system/structure.

### **Module CON1120: Project Management**

Students develop basic shop drawing and estimating skills, and apply them to build a product.

### **Module CON1130: Solid Stock Construction**

Students develop basic hand and power tool skills to build a product made from solid wood.

### **Module CON1140: Turning Operations**

Students use wood-turning equipment and techniques to create a faceplate and spindle turning made from solid and/or built-up stock.

### **Module CON1160: Manufactured Materials**

Students select and use the appropriate materials and tools to build a product or structure from a wood composite or other manufactured material.

### **Module CON1180: Mold Making & Casting**

Students apply knowledge of casting and molding materials and processes to prepare a mold and produce a casting.

### **Module CON2010: Site Preparation**

Students develop the knowledge and skills to acquire a building permit and to locate and prepare a site for excavation and foundation work.

### **Module CON2020: Concrete Forming**

Students develop knowledge and skills related to the preparation and construction of a concrete foundation.

### **Module CON2030: Alternate Foundations**

Students develop basic knowledge and skills related to the design and construction of an alternative foundation system.

### **Module CON2040: Framing Systems 1 (Floor & Wall)**

Students develop basic framing knowledge and skills associated with the construction of a floor and wall system.

### **Module CON2050: Roof Structures 1 (Framing & Finishing)**

Students develop basic knowledge and skills associated with framing and finishing a simple roof system.

### **Module CON2060: Exterior Finishing (Door, Window & Siding)**

Students apply and develop basic knowledge of door, window and siding systems and installation skills and procedures.

### **Module CON2070: Electrical Systems**

Students apply electrical principles, and develop an understanding of residential electrical code requirements and installation procedures.

### **Module CON2080: Plumbing Systems**

Students develop basic knowledge and skills to fabricate and make repairs to residential drainage, waste, vent (DWV) and water supply systems.

### **Module CON2090: Climate Control Systems**

Students investigate common heating, ventilating and air conditioning (HVAC) systems and principles, and participate in the installation or maintenance of one of these systems.

### **Module CON2100: Agri-structures**

Students apply construction principles and skills, and use pre-engineered designs to build a structure to be used for agricultural purposes.

### **Module CON2120: Multiple Materials**

Students develop a product that incorporates two or more types of material in its construction.

### **Module CON2130: Furniture Making 1 (Box Construction)**

Students develop basic joinery skills and knowledge related to case construction, by producing a box-type piece of furniture.



**Module CON2140: Furniture Making 2 (Frame & Panel)**

Students use solid and/or composite materials to build a frame and panel product or component.

**Module CON2150: Finishing & Refinishing**

Students use knowledge of finishing materials and finishing techniques to apply new and replacement finishes.

**Module CON2160: Cabinetmaking 1 (Web & Face Frame)**

Students apply web and face frame construction techniques, and use solid and/or manufactured materials to produce a built-in or modular cabinet.

**Module CON2170: Cabinetmaking 2 (Door & Drawer)**

Students use solid and composite materials to develop skills in building cabinet doors and drawers.

**Module CON2180: Wood Forming**

Students apply skills in mold making and wood conditioning to make a formed part or component.

**Module CON2190: Manufacturing Systems**

Students investigate the nature of manufacturing systems used to produce durable goods.

**Module CON2200: Product Development**

Students work, individually or as team members, to research, design and build a product suitable for mass production and marketing.

**Module CON3010: Concrete Work (Structures & Finishes)**

Students develop essential skills to form, place and finish a concrete project.

**Module CON3020: Masonry Work (Structures & Finishes)**

Students develop basic knowledge and skills related to masonry materials, structures and finishes.

**Module CON3030: Wall & Ceiling Finishing**

Students develop basic knowledge and skills to insulate, install and finish an interior wall/ceiling surface.

**Module CON3040: Stair Construction**

Students develop the knowledge and skills required to build a straight flight of stairs.

**Module CON3050: Roof Structures 2 (Framing & Covering)**

Students develop basic competencies in laying out, cutting and assembling common and hip and valley rafters in relation to specialized structures and coverings.

**Module CON3060: Doors & Trim**

Students apply basic finish carpentry knowledge and skills to install doors, railings and moldings.

**Module CON3070: Floorcovering**

Students develop skills in selecting and installing typical floor coverings used in residential, institutional and commercial buildings.

**Module CON3080: Energy-Efficient Housing**

Students investigate construction practices and support systems to create an energy-efficient housing design.

**Module CON3090: Renovations/Restorations**

Students work with a client to plan and complete a building renovation and/or restoration.

**Module CON3100: Commercial Structures**

Students investigate structural designs, construction techniques and work site practices related to commercial construction.

**Module CON3110: Site Management**

Students consider the efficient and timely delivery of a quality product. They investigate and report on site management theories and practices to produce a project management plan.

**Module CON3120: Tool Maintenance**

Students develop skills in preventive maintenance by routinely inspecting and servicing production tools and equipment.



**Module CON3130: Furniture Making 3 (Leg & Rail)**

Students use solid and/or manufactured materials and leg-and-rail or pedestal construction techniques to build a free-standing piece of furniture.

**Module CON3140: Furniture Making 4 (Surface Enhancement)**

Students explore and demonstrate the use of veneer, inlay, carving and/or marquetry techniques to enhance the appearance of a product or component.

**Module CON3150: Furniture Repair**

Students apply basic knowledge of furniture construction and materials to repair or replace existing components or coverings.

**Module CON3160: Cabinetmaking 3 (Cabinet/Countertops)**

Students develop the knowledge and skills required to build and install a simple cabinet/countertop complete with an appropriate backsplash and edge treatment.

**Module CON3170: Cabinetmaking 4 (Layout & Installation)**

Students develop a floor/wall cabinet plan and order and install a set of prebuilt cabinets.

**Module CON3190: Production Planning**

Students plan, individually or as team members, a production system, and create the necessary work cells and floor plan to produce a given product in a safe and efficient manner.

**Module CON3200: Production Management**

Students identify and enhance management skills in relation to the development and deployment of people and physical resources.

**Module CON3210: Framing Systems 2 (Floor, Wall & Ceiling)**

Students develop appropriate layout and assembly skills to install conventional and/or engineered framing components associated with residential and/or light commercial construction.



## SECTION C: PLANNING FOR INSTRUCTION

CTS provides increased opportunity for junior and senior high schools to design courses based on the needs and interests of their students and the circumstances within the school and community. Some strands may be appropriately introduced at the junior high school level. Other strands are more appropriately introduced at the senior high school level or to Grade 9 students. Refer to this section for recommendations regarding the Legal Studies strand, or the *Career & Technology Studies Manual for Administrators, Counsellors and Teachers* for a summary of the recommended grade levels for each strand.

### PLANNING FOR CTS

#### Defining Courses

Schools determine which strands and modules will be offered in a particular school, and will combine modules into courses.

Each module was designed for approximately 25 hours of instruction. However, this time frame is only a guideline to facilitate planning. The CTS curricula are competency based, and the student may take more or less time to gain the designated competencies within each module.

A course will usually consist of modules primarily from the same strand but, where appropriate, may include modules from other strands. Refer to the *Career & Technology Studies Manual for Administrators, Counsellors and Teachers* (Appendix 4) for more information on course names and course codes.

Module selection and sequencing should consider:

- prerequisite(s)
- supporting module(s) (other CTS modules that may enhance the learning opportunity if offered with the module)
- module parameters
  - instructional qualifications, if specialized
  - equipment and facility requirements, if specialized.

The module parameters are defined for each module in Sections D, E and F of this Guide.

#### Degree of Flexibility

The CTS program, while designed using the modular structure to facilitate flexible timetabling and instructional delivery, does not mandate the degree of flexibility a school or teacher will offer. The teacher and school will determine the degree of flexibility available to the student. Within the instructional plan established by the school, the student may:

- be given the opportunity to progress at a rate that is personally challenging
- have increased opportunity to select modules that develop competencies he or she finds most relevant.

#### Integrating Basic Competencies

The basic competencies relate to managing learning and resources, problem solving and innovation, communicating effectively, working with others and demonstrating responsibility are developed throughout the CTS program, and are within each module.

Assessment of student achievement on the basic competencies is integrated throughout the other module learner expectations. Refer to Section G (Assessment Tools) of this Guide for the description of student behaviours expected at each of the four developmental stages defined for the basic competencies.

Assessment of basic competencies could include input and reflection involving the student, teacher(s), peers and others. Description of the observed behaviour could be provided through a competency profile for the module. Positive, ongoing interaction between the student and teacher will support motivation for student growth and improvement.



## Assessing Student Achievement

Assessing student achievement is a process of gathering information by way of observations of process, product and student interaction.

Where appropriate, assessment tools have been defined to assist the teacher and student in the assessment. Refer to Section G (Assessment Tools) of this Guide for copies of the various tools (worksheets, checklists, sample questions, etc.).

A suggested emphasis for each module learner expectation has also been established. The suggested emphasis provides a guideline to help teachers determine time allocation and/or the appropriate emphasis for each MLE and student grade.

## Recognizing Student Achievement

At the high school level, successful demonstration of the exit-level competencies in a module qualifies the student for one credit. Refer to Section A of this Guide for more detailed information about how curriculum and assessment standards are defined in CTS. Refer to the *Career & Technology Studies Manual for Administrators, Counsellors and Teachers* (Appendix 12) for more information on how student achievement can be recognized and reported at the school and provincial levels.

## Portfolios

When planning for instruction and assessment, consider a portfolio as an excellent tool to provide evidence of a student's effort, progress and achievement. Portfolios will aid students in identifying skills and interest. They also provide the receiving teacher, employer and/or post-secondary institution proof of a student's accomplishments. The make-up and evaluation of the portfolio should be a collaborative agreement between the student and teacher.

## Resources

A comprehensive resource base, including print, software and audio-visual, has been identified to support CTS strands. It is intended that these resources form the basis of a resource centre, encouraging teachers and students to access a wide selection of resources and other information sources throughout the learning process. Unless otherwise noted, these resources are considered to be suitable for both junior and senior high school students.

Authorized resources may be obtained from the Learning Resources Distributing Centre or directly from the publisher or distributor. Refer to Section I (Learning Resource Guide) of this Guide for the complete resource list including curriculum correlations and resource annotations. Additional sources refer to noncommercial or government agencies that offer resources that may be of assistance in this strand.

## Student Learning Guides

In addition to the resources, sample Student Learning Guides are available (refer to Section J of this Guide). These samples, designed for individual student or small group use, provide an instructional plan for selected modules and include the following components:

- Why take this module?
- What are the entry-level competencies?
- What are the exit-level competencies?
- What resources may be accessed?
- What assignments/activities must be completed?
- What are the timelines?
- How will the final mark be calculated?

Sample Student Learning Guides have been developed for the following modules in Construction Technologies:

- CON1010 Basic Tools & Materials
- CON2010 Site Preparation
- CON3040 Stair Construction.



## Community Resources

The community can become a major stakeholder and effective partner in the learning process. The use of community members and resources should be integrated into course planning. Business, industry and government agencies offer a wide range of services and resources, as do local clubs, service groups and institutions. When planning for the use of community resources, teacher should ensure that related presentations, activities and work settings:

- are consistent with student knowledge and skill levels
- demonstrate sound pedagogy
- are exemplary of approved health and safety standards
- provide a balanced approach to curriculum topics and related issues.

## Off-Campus Excursions

Field excursions are also recommended and should be an important part of teaching and learning throughout the Construction Technologies stands. Safety must be a prime consideration in planning off-campus learning experiences. Both teachers and students should engage in activities commensurate with their level of training and ability. Adequate instructional support, guidance and supervisor must be provided at all times. Local jurisdiction and school policies must be understood and observed by principals, teachers, parents, supervisors and students.

## PLANNING FOR CONSTRUCTION TECHNOLOGIES

The following suggestions are provided to assist teachers, school and school system administrators as they plan to deliver modules from the Construction Technologies strand.

## Teaching Strategies

A practical “hands-on” approach, where theory and practice are developed in concert with one another, is encouraged throughout Construction Technologies. When teaching content in an applied setting, lecture-type classes should be avoided as much as possible. Teachers should attempt to integrate theory and practice by engaging students in practical experiences. Students who work on meaningful assignments and useful projects are more easily motivated to develop the required knowledge skills and attitudes outlined in each module. Refer to the *Career & Technology Studies Manual for Administrators, Counsellors and Teachers* (Appendix 9) for additional teaching strategies.

## Health and Safety and Related Legislation

The health and safety of students and teachers is protected by law. Every worker has the right to be protected from injury and needs to know how to safely use, store and transport hazardous materials. Teachers of Construction Technologies must ensure that students are working in a safe and healthy environment. Students should therefore be encouraged to work in a safe manner and identify and report existing and potential hazards within the learning environment. Accident prevention is one of the most important concepts a student learns in Construction Technologies strands.

Teachers of Construction Technologies modules should also be aware of the issues address in the *Occupational Health and Safety Act*, Worker’s Compensation regulations and local fire and building codes related to this strand.



## Off-site Risk Management

Safety and risk management involves exercising situation-specific judgement throughout the course of an off-campus excursion. Judgement is the product of experience, and may include recognizing factors such as dangers imposed by equipment, a decline in physical strength, or a more challenging task. Many of the hazard recognition skills can be taught in the classroom in the preparation stage.

A significant aspect of off-site risk management is group management. Teachers can exercise appropriate group management strategies by focusing attention on:

- pacing and observation distance, including speed of travel, rest stops, distance travelled and maintaining safe distance for observations
- group control, including position of leader, regrouping procedures, signal systems and buddy systems
- the establishment of group rules and norms
- clearly defined task allocations for each student
- objective hazard recognition on the site, including machinery and equipment.

For additional information on health and safety standards in CTS, refer to the *CTS Manual for Administrators, Counsellors and Teachers* (Appendix 13).

## Instructional Qualifications

Responsibility for instructional planning and delivery of courses in Construction Technologies will be assumed by Alberta certified teachers. For additional teacher qualifications, refer to the module parameters in each module for the formalized training and certificates requirements for each module. It should be noted that where modules or portions of modules require special instructional qualification, these modules or parts of modules can be delivered off-campus by other qualified individuals.

Many of the competencies developed in Construction Technologies relate directly to a number of recognized trade areas. The *Alberta Apprenticeship and Training Act* clearly outlines who can or cannot work in compulsory and optional trade areas. The act states: *A person shall not work in a compulsory or optional trade area unless that person:*

- a. holds a trade certificate*
- b. is an apprentice in the specified trade*
- c. is authorized under Section 23 to work or perform one or more tasks in the trade*
- d. is a student in a student work training program in that trade*

In addition, in an optional certificated trade area, a person who does not hold a trade certificate, may work in or perform one or more tasks, activities or functions if the employer is satisfied that the person possesses the skills and knowledge in the trade as would be expected from one who would be in possession of a trade certificate.

It should also be noted that the *Act* spells out the ratio of journeyman to apprentices, which is a minimum of one apprentice to each journeyman employed. This ruling would apply specifically to Registered Apprenticeship Program.

## Selecting Modules

Course planning should take into consideration module sequences that link with both physical and human resources present in the school and community.

The scope and sequence chart in Section B of this Guide provides an overview of the Construction Technologies modules, indicating prerequisites and theme areas. In addition, a brief description of each module can be found in this section following the scope and sequence chart.

## Construction Technologies in Junior High

Most introductory level modules may be offered to junior high school students. Since resources and expertise will vary in each school and community, it is important to assess potential support networks before selecting specific modules and module sequences.



The number of modules will vary according to the time available throughout Grades 7, 8 and 9 as outlined below:

Time Available	Modules
25 hours	<b>Basic Tools &amp; Materials</b>
50 hours	<i>add to the previous module</i> <b>Building Construction</b>
75 – 100 hours	<i>add one or two of the following:</i> <b>Project Management</b> <b>Solid Stock Construction</b> <b>Turning Operations</b> <b>Mold Making &amp; Casting</b>

Where appropriate, junior high school students may also become involved in intermediate level modules, particularly in the Manufacturing theme.

### ***Construction Technologies in Senior High***

Depending on the interest and intent of the students, modules in Construction Technologies may be clustered in a variety of ways. Students with a general interest in the strand may wish to sample modules from the various themes, while those with specific interests may focus on a cluster of modules related to welding, sheet metal, foundry or machining as outlined in the Scope and Sequence chart.

As in all CTS strands, students will identify, explore and prepare for future career opportunities. It is recommended that course planning include the integration of relevant career investigations throughout each module, rather than in a singular or isolated study. Career profiles, interviews and job shadowing will acquaint students with the many technical and professional careers associated within the field of fabrication.

Students intending to continue their studies in a post-secondary institution and/or through apprenticeship should be aware of the post-secondary and apprenticeship linkages referred to in Section H of this Guide. For example, basic to most trade-related programs is the need to have

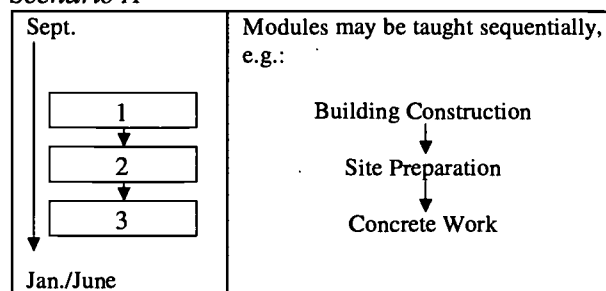
well-developed print reading and hand-tool skills. Such considerations will affect module selection.

Before selecting modules, teachers should check the module parameters outlined in each module (see Sections D, E and F of this Guide).

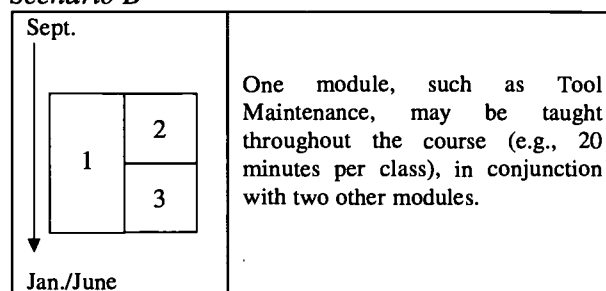
### **Module Blocking and Sequencing**

Modules can be delivered sequentially, concurrently or combined as 3-, 5- or 6-credit courses as outlined below:

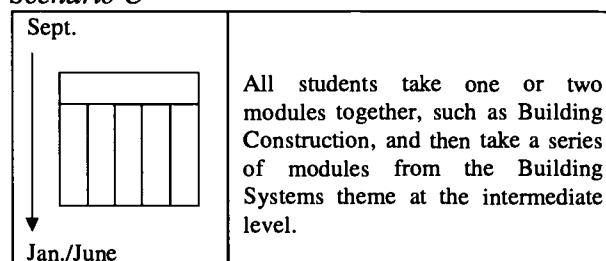
#### ***Scenario A***



#### ***Scenario B***



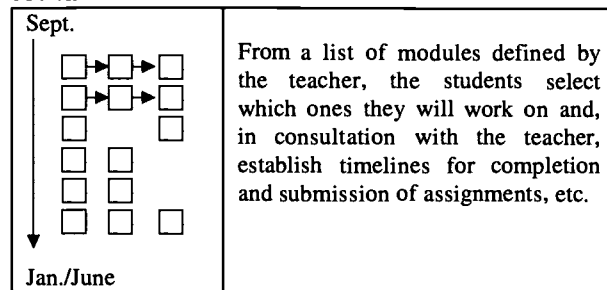
#### ***Scenario C***





Teachers can also allow students to progress at a rate that is personally challenging; e.g.:

#### Scenario D



#### Identifying Linkages

Section H of this Guide describes some possible linkages between the Construction Technologies strand and:

- other CTS strands
- complementary programs such as art and drama
- core programs, e.g., mathematics, science, social studies and language arts
- off-campus programs.

Note that project modules from the Career Transitions strand may be combined with modules from the Construction Technologies strand to provide increased opportunity for students to develop expertise and refine their competencies.

Project modules are **not** designed to be offered as distinct courses and should **not** be used to extend Work Experience 15, 25 and 35 courses.

#### Improving Smooth Transitions to the Workplace and/or Post-secondary Programs

As in other CTS strands, students will assess and prepare for future career opportunities. It is recommended that program planning include the integration of relevant career information and experiences. Through the development of career-specific skills, occupational profiles and on-site activities, students become aware of the training requirements and career opportunities related to the fabrication sector of the economy.

Refer to Section H of this Guide for potential transitions students may make into:

- the workplace
- related post-secondary programs or other avenues for further learning.



# MODULE CURRICULUM AND ASSESSMENT STANDARDS:

## SECTION D: INTRODUCTORY LEVEL

The following pages define the curriculum and assessment standards for the introductory level of Construction Technologies.

Introductory level modules help students build daily living skills and form the basis for further learning. Introductory modules are developed for students who have no previous experience in the strand.

Module learner expectations define the competencies a student must demonstrate to achieve success in a module. Assessment standards define the criteria and conditions to be used for assessing the competencies defined in the module learner expectations.

Specific learner expectations provide a detailed framework for instruction and help students build the competencies defined in the module learner expectations. Additional information and suggestions for instruction are provided in the Notes column; teachers may wish to use this space to record their ideas for instruction or student projects.

Module CON1010:	Basic Tools & Materials .....	D.3
Module CON1070:	Building Construction .....	D.7
Module CON1120:	Project Management.....	D.11
Module CON1130:	Solid Stock Construction.....	D.15
Module CON1140:	Turning Operations .....	D.19
Module CON1160:	Manufactured Materials .....	D.23
Module CON1180:	Mold Making & Casting .....	D.27



## MODULE CON1010: BASIC TOOLS & MATERIALS

**Level:** Introductory

**Theme:** Building Systems (Processes and Applications)

**Prerequisite:** None

**Module Description:** Students develop basic hand tool and production skills to transform, safely, common building materials into useful products.

**Module Parameters:** Access to a materials work centre, complete with basic hand tools.

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"><li>identify and describe the safe use of basic hand tools</li></ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"><li>the identification and description of 20 basic hand tools used in construction and fabrication to include two or more:<ul style="list-style-type: none"><li>– measurement and layout tools</li><li>– cutting and boring tools</li><li>– assembly and dismantling tools</li><li>– abrading and sharpening tools.</li></ul></li></ul> <i>Assessment Tool</i> <i>Presentations/Reports: Hand Tools, CON1010-1</i> <i>Illustrative Example: Hand Tool Presentation, CON1010-2</i> <i>Standard</i> <i>Correct identification and description of 16 basic hand tools</i> <i>Performance rating of 1 for each applicable task</i>	15
<ul style="list-style-type: none"><li>identify and compare the properties of common materials used in construction and fabrication activities</li></ul>	<ul style="list-style-type: none"><li>a written or oral presentation that compares the properties of four different materials in any two of the following material categories:<ul style="list-style-type: none"><li>– solid and manufactured wood products</li><li>– ferrous and nonferrous metals</li><li>– thermoforming and thermosetting plastics</li><li>– clay and concrete products.</li></ul></li></ul> <i>Assessment Tool</i> <i>Presentations/Reports: Material Identification, CON1010-3</i> <i>Standard</i> <i>Performance rating of 1 for each applicable task</i>	15

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## MODULE CON1010: BASIC TOOLS & MATERIALS (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• apply construction/fabrication processes and skills to produce a product</li> <li>• demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• demonstration of safe construction and fabrication skills to plan, construct/fabricate, assemble and finish a useful product.</li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Framework: Project Assessment, CONPRO</i></p> <p><i>Standard</i>  <i>The product is made according to the prepared drawing and event sequence, tools and materials are used according to accepted safe practice</i>  <i>Performance rating of 1 for each applicable task</i></p> <ul style="list-style-type: none"> <li>• observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>70</p> <p>Integrated Throughout</p>

Concept	Specific Learner Expectations	Notes
<p>Orientation</p> <ul style="list-style-type: none"> <li>• Tools and Equipment</li> <li>• Materials</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• identify and describe basic hand tools that are used to measure, mark, hold, cut, form, fasten and finish materials</li> <li>• identify and compare the properties of a variety of common materials used to make artifacts and structures</li> <li>• identify common shapes, sizes and forms of construction and fabrication materials</li> </ul>	<p>Introduce students to the safe use of manually operated and power assisted hand tools.</p> <p>Discuss reasons for choosing one material over another for a given application.</p>



## MODULE CON1010: BASIC TOOLS & MATERIALS (continued)

Concept	Specific Learner Expectations	Notes
<ul style="list-style-type: none"> <li>Health and Safety</li> <li>Production Systems</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>describe appropriate methods to handle, recycle, store and dispose materials</li> <li>identify and demonstrate the appropriate use of personal protective equipment</li> <li>identify steps to be taken in the event of an accident</li> <li>outline the typical phases in a production system; e.g.:               <ul style="list-style-type: none"> <li>planning</li> <li>constructing/fabricating</li> <li>assembling</li> <li>finishing</li> <li>evaluating.</li> </ul> </li> </ul>	<p>Help students evaluate the short- and long-term impact of the choice of a material on the health of individuals and the environment.</p> <p>Compare those activities to the input, process, output and feedback mechanisms described in other technological systems.</p>
<p>Planning and Management</p> <ul style="list-style-type: none"> <li>Product Development</li> </ul>	<ul style="list-style-type: none"> <li>select or modify a plan for a simple product that will meet a defined need</li> <li>identify and select the appropriate tools, materials and processes required to make the product</li> <li>list the steps that are required to make a product in a safe and logical order.</li> </ul>	<p>Students are more highly motivated if they can choose and personalize a project.</p>
<p>Implementation</p> <ul style="list-style-type: none"> <li>Material Processing</li> </ul>	<ul style="list-style-type: none"> <li>develop basic construction/fabrication skills by building, assembling and finishing a variety of products.</li> </ul>	<p>In addition to woods and metals, students should gain experience using a variety of materials such as plastic and earths.</p>
<p>Assessment</p> <ul style="list-style-type: none"> <li>Product Quality</li> <li>Career Preparation</li> </ul>	<ul style="list-style-type: none"> <li>describe ways to improve product quality and productivity</li> <li>create a record of completed activities within a portfolio.</li> </ul>	<p>Students should be encouraged to make reflective notes and keep a record of their completed work.</p>



## MODULE CON1070: BUILDING CONSTRUCTION

**Level:** Introductory

**Theme:** Building Systems (Processes and Applications)

**Prerequisite:** CON1010 Basic Tools & Materials

**Module Description:** Students examine common building systems, and develop basic skills related to building a simple model or full-size system/structure.

**Module Parameters:** Access to a materials work centre complete with basic hand tools.

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"><li>identify and describe the main systems found in a residential structure</li></ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"><li>an oral or written presentation that identifies and describes the four major systems found in a residential structure.</li></ul> <i>Assessment Tool</i> <i>Presentations/Reports: Building Systems, CON1070-1</i> <i>Standard</i> <i>Presentation will identify and describe the purpose and major components of the structural, electrical, heating and plumbing systems</i> <i>Performance rating of 1 for each applicable task</i>	20
<ul style="list-style-type: none"><li>list and describe the basic materials and hand tools used in building construction</li></ul>	<ul style="list-style-type: none"><li>the accurate identification and description of four different building materials and 10 hand tools used in building construction.</li></ul> <i>Assessment Tool</i> <i>Presentations/Reports: Building Systems, CON1070-1</i> <i>Standard</i> <i>Performance rating of 1 in each applicable task</i>	20

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## MODULE CON1070: BUILDING CONSTRUCTION (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• apply basic construction techniques to build a simple scale model or full-size structure/system</li> <li>• profile a trade or occupation within the building construction industry</li> <li>• demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• demonstration of safe construction skills in the building of a simple model or full-size building structure/system.</li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Framework: Activity Assessment, CONACT</i></p> <p><i>Standard</i>  <i>Full size structure or model is built according to accepted practice and meets overall specifications outlined on the working drawing</i>  <i>Performance rating of 1 for each applicable task</i></p> <ul style="list-style-type: none"> <li>• presentation that outlines one or more trades or occupations and range of career opportunities within the building construction industry; e.g.: <ul style="list-style-type: none"> <li>– carpenter</li> <li>– cabinetmaker</li> <li>– plumber</li> <li>– electrician.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Research Process: Career Opportunities in Building Construction, CON1070–2</i></p> <p><i>Standard</i>  <i>Performance rating of 1 for each applicable task</i></p> <ul style="list-style-type: none"> <li>• observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>55</p> <p>5</p> <p>Integrated throughout</p>



## MODULE CON1070: BUILDING CONSTRUCTION (continued)

Concept	Specific Learner Expectations	Notes
<p>Orientation</p> <ul style="list-style-type: none"> <li>Nature of Construction</li> <li>Project Design and Construction</li> <li>Health and Safety</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>list and describe the major types of construction projects; e.g.: <ul style="list-style-type: none"> <li>residential</li> <li>industrial</li> <li>commercial</li> <li>civil</li> </ul> </li> <li>describe how information is gathered and used in the construction industry</li> <li>list and describe the systems that are found in most buildings; e.g.: <ul style="list-style-type: none"> <li>structural</li> <li>electrical</li> <li>heating, ventilating and air conditioning</li> <li>water and waste removal</li> </ul> </li> <li>describe the methods that are used to communicate ideas and information relative to design and construction of a project</li> <li>identify the factors that affect the design of a structure such as safety, function and aesthetics</li> <li>identify design techniques that are used to counteract static and dynamic forces on a structure</li> <li>describe how structural materials and construction tools are safely used on the work site.</li> </ul>	<p>Students should understand that a construction project can be something other than a building.</p> <p>Refer to the clients' needs, site information engineering specifications and building codes.</p> <p>Have students gain experiences reading simple architectural drawings.</p> <p>Investigate the use of braces, trusses and ties commonly used in construction.</p> <p>Have students become aware of the role of OH&amp;S in relation to workers.</p>
<p>Planning and Management</p> <ul style="list-style-type: none"> <li>Design</li> </ul>	<ul style="list-style-type: none"> <li>select or modify a set of working drawings to build a simple building structure or system</li> <li>select or identify an appropriate location</li> </ul>	<p>The structure can be full size or built to scale.</p>



# **MODULE CON1070: BUILDING CONSTRUCTION (continued)**

Concept	Specific Learner Expectations	Notes
<ul style="list-style-type: none"> <li>Material Selection</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>identify the materials that can be used to construct the: <ul style="list-style-type: none"> <li>foundation or support system</li> <li>floor and wall system</li> <li>roof system</li> <li>exterior/interior finishes</li> </ul> </li> <li>describe the landscaping features that will be used to complete the project.</li> </ul>	<p>All terminology used in this module should be consistent with the <i>Canadian Wood-Frame House Construction</i> glossary of terms.</p>
<p>Implementation</p> <ul style="list-style-type: none"> <li>Building Processing</li> <li>Personal Safety</li> </ul>	<ul style="list-style-type: none"> <li>use the appropriate tools, materials and processes to: <ul style="list-style-type: none"> <li>construct a simple shelter, scale model or system</li> </ul> </li> <li>use the appropriate personal protective clothing and equipment.</li> </ul>	
<p>Assessment</p> <ul style="list-style-type: none"> <li>Career Information</li> <li>Career Preparation</li> </ul>	<ul style="list-style-type: none"> <li>identify and describe skilled, technical and professional occupations that are related to the building construction industry</li> <li>identify and assess personal interests and abilities related to making realistic career choices</li> <li>maintain a record of completed activities within a portfolio.</li> </ul>	



## MODULE CON1120: PROJECT MANAGEMENT

**Level:** Introductory

**Theme:** Manufacturing Systems (Processes and Applications)

**Prerequisite:** CON1010 Basic Tools & Materials

**Module Description:** Students develop basic shop drawing and estimating skills, and apply them to build a product.

**Module Parameters:** Access to a materials work centre, complete with basic drawing and construction tools, and to instruction from an individual with specialized training in the use of power tools.

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"><li>identify and describe the parts of a technological system</li></ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"><li>visual presentation of a technological system that includes:<ul style="list-style-type: none"><li>identification of the components of a technological system such as input, process, output, feedback</li><li>description of each component</li><li>explanation of the difference between an open and closed system.</li></ul></li></ul> <i>Assessment Tool</i> <i>Presentations/Reports: Technological System, CON1120-1</i> <i>Illustrative Example: Technology System, CON1120-2</i>	10
<ul style="list-style-type: none"><li>apply basic drawing skills to prepare a shop drawing</li></ul>	<i>Standard</i> <i>Performance rating of 1 for each applicable task</i> <ul style="list-style-type: none"><li>demonstration of basic drawing skills to produce a shop drawing of a simple product with two or more parts.</li></ul> <i>Assessment Tool</i> <i>Project Assessment: Project Development and Presentation, CON1120-3</i> <i>Standard</i> <i>Views are to be appropriately identified, laid out and measurements are within the accepted tolerance of <math>\pm 1</math> mm. Quality of lining, dimensioning and lettering meet accepted practice</i> <i>Performance rating of 1 for each applicable task</i>	25



## MODULE CON1120: PROJECT MANAGEMENT (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>prepare a project timeline, cost estimate and work schedule</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>completion of a bill of materials, time and cost estimate and event sequence for a simple multiple part project.</li> </ul> <p><i>Assessment Tool</i>  <i>Project Assessment: Project Development and Presentation, CON1120-3</i></p> <p><i>Standard</i>  <i>Bill of materials includes proper material and size description; accurate quantities of materials and costs. Major events are identified, time estimated and sequenced in a safe and logical manner</i>  <i>Performance rating of 1 for each applicable task</i></p>	15
<ul style="list-style-type: none"> <li>apply the use of a technological system to construct a simple product with multiple parts</li> </ul>	<ul style="list-style-type: none"> <li>demonstration of basic production skills to safely construct a product with multiple parts or components.</li> </ul> <p><i>Assessment Tool</i>  <i>Project Assessment: Project Development and Presentation, CON1120-3</i>  <i>Illustrative Example: Technology System, CON1120-2</i></p> <p><i>Standard</i>  <i>The product is constructed according to the prepared drawing, event sequence, cost and time estimates</i>  <i>Performance rating of 1 for each applicable task</i></p>	50
<ul style="list-style-type: none"> <li>demonstrate basic competencies.</li> </ul>	<ul style="list-style-type: none"> <li>observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	Integrated throughout



## MODULE CON1120: PROJECT MANAGEMENT (continued)

Concept	Specific Learner Expectations	Notes
<p>Orientation</p> <ul style="list-style-type: none"> <li>Technological System</li> <li>Drawing Types</li> <li>Product Design</li> <li>Estimating</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>describe the components of a technological system; e.g.: <ul style="list-style-type: none"> <li>input</li> <li>output</li> <li>process</li> <li>feedback</li> </ul> </li> <li>list and describe common types of shop drawings</li> <li>identify manual techniques and/or computer processes to create a drawing</li> <li>identify a variety of products and describe the types of materials, joints, fastening and finishing systems that are used and explain how these details are shown on a drawing</li> <li>identify the method of costing materials using lineal, area and volume measurements</li> <li>describe methods that are used to estimate the amount of time required to complete a project.</li> </ul>	<p>Use activities related to the planning and development of a simple product to show how the parts of a technologies system work together.</p> <p>Have the students work primarily with orthographic, oblique and isometric drawings.</p> <p>Have students identify the types of fasteners and adhesives that are used in conjunction with butt, dado, rabbet and miter joints to produce a product.</p> <p>Point out the importance of being able to measure and calculate accurately in time and cost estimates and quality of the product.</p>
<p>Planning and Management</p>	<ul style="list-style-type: none"> <li>create or modify a suitable product design</li> <li>prepare a working drawing of a product with multiple parts</li> <li>analyze the drawing to create a: <ul style="list-style-type: none"> <li>material list</li> <li>cost estimate</li> <li>work schedule.</li> </ul> </li> </ul>	<p>Project choices might include:</p> <ul style="list-style-type: none"> <li>toy</li> <li>furniture accessory</li> <li>kitchen accessory.</li> </ul>



## MODULE CON1120: PROJECT MANAGEMENT (continued)

Concept	Specific Learner Expectations	Notes
<b>Implementation</b> <ul style="list-style-type: none"> <li>Material Processing</li> <li>Health and Safety</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>for a product with multiple parts, use the appropriate tools, materials and processes to: <ul style="list-style-type: none"> <li>– lay out, cut, surface and size materials</li> <li>– assemble and fasten parts</li> <li>– prepare for finishing</li> <li>– apply a simple finish</li> </ul> </li> <li>matches the manufacturer's recommendations and WHMIS regulations when using hazardous finishing materials</li> <li>use personal protective equipment.</li> </ul>	<p>Review tool and equipment safety as well as the safe use of hazardous materials.</p> <p>Ensure containers are labelled and adequate ventilation is provided.</p>
<b>Assessment</b> <ul style="list-style-type: none"> <li>Quality Control</li> <li>Career Preparation</li> </ul>	<ul style="list-style-type: none"> <li>identify methods to improve quality and productivity; e.g.: <ul style="list-style-type: none"> <li>– accurate measurements</li> <li>– choice of correct tools</li> <li>– use of tools that are in good condition</li> </ul> </li> <li>maintain a record of completed activities within a portfolio.</li> </ul>	<p>Students should be encouraged to make reflective notes and keep a record of work completed.</p>



## MODULE CON1130: SOLID STOCK CONSTRUCTION

**Level:** Introductory

**Theme:** Manufacturing Systems (Processes and Applications)

**Prerequisite:** CON1010 Basic Tools & Materials

**Module Description:** Students develop basic hand and power tool skills to build a product made from solid wood.

**Module Parameters:** Access to a materials work centre complete with basic hand and power tools, and to instruction from an individual with specialized training in the use of power tools.

**Supporting Module:** CON1120 Project Management

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"><li>identify and describe the physical characteristics of a variety of hard and soft woods</li></ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"><li>the accurate identification and description of four solid woods used to construct wooden products. <i>Assessment Tool</i> <i>Response Assessment: Wood Characteristics, CON1130-1</i> <i>Standard</i> <i>Response rating of 1</i></li></ul>	15
<ul style="list-style-type: none"><li>apply basic drawing and transfer skills to prepare a pattern or template</li></ul>	<ul style="list-style-type: none"><li>application of the principles of proportion and transfer skills to produce a pattern or template from a scale drawing. <i>Standard</i> <i>The template is to be within <math>\pm 1</math> mm of the original plan or object</i> <i>Performance rating of 1 for each applicable task</i></li></ul>	15
<ul style="list-style-type: none"><li>construct a wooden product, using basic joinery techniques</li></ul>	<ul style="list-style-type: none"><li>demonstration of basic joinery skills to safely construct a product from solid stock. <i>Assessment Tool</i> <i>Project Assessment: Building with Solid Stock, CON1130-2</i> <i>Illustrative Example: Cutting Board, CON1130-3</i> <i>Standard</i> <i>The product should be constructed according to the prepared template, working drawing and event sequence. Joints are to be tight fitting, surfaces should be free of marks, gouges, burns and voids</i> <i>Performance rating of 1 for each applicable task</i></li></ul>	70

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## MODULE CON1130: SOLID STOCK CONSTRUCTION (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p>Orientation</p> <ul style="list-style-type: none"> <li>Solid Stock</li> <li>Built-up Stock</li> <li>Tool Safety</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>describe the physical characteristics of a variety of hard and soft woods</li> <li>list and describe common wood faults</li> <li>identify and describe correct methods of handling and storing lumber</li> <li>describe common methods of making a built-up surface using edge joints and reinforce with dowels, biscuits or splines</li> <li>describe the process of squaring solid stock</li> <li>describe the safe operation of hand and power equipment that are used to: <ul style="list-style-type: none"> <li>joint and surface solid stock</li> <li>cut and shape irregular surfaces</li> <li>scrape and sand flat and irregular surfaces.</li> </ul> </li> </ul>	<p>Point out the importance of storing materials correctly.</p> <p>Stress the importance of squaring stock in the proper sequence.</p> <p>Introduce students to the appropriate hand and power tools.</p>



# **MODULE CON1130: SOLID STOCK CONSTRUCTION (continued)**

Concept	Specific Learner Expectations	Notes
<b>Planning and Management</b> <ul style="list-style-type: none"> <li>Product Design</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>identify common shapes and lines used in product design</li> <li>select or modify a plan for a free-standing or wall-mounted product that is made from solid or built-up stock</li> <li>produces a pattern or template from a scale drawing</li> <li>develop a cutting list and event sequence.</li> </ul>	<p>Explain how straight, circular and curved lines can be used to form pleasing shapes.</p> <p>Projects to consider might include a wall or corner shelf, bench, cutting board or turned product.</p>
<b>Implementation</b> <ul style="list-style-type: none"> <li>Material Processing</li> </ul>	<ul style="list-style-type: none"> <li>use the appropriate tools, materials and processes to: <ul style="list-style-type: none"> <li>cut and surface stock</li> <li>joint, glue and clamp</li> <li>measure and lay out parts</li> <li>cut and shape parts</li> <li>assemble and fasten</li> <li>prepare for finishing</li> <li>apply a finish.</li> </ul> </li> </ul>	<p>It is important that students receive safety instruction prior to the use of hand and power tools.</p>
<b>Assessment</b> <ul style="list-style-type: none"> <li>Quality control</li> <li>Career Preparation</li> </ul>	<ul style="list-style-type: none"> <li>complete a visual inspection of the product to see that the joints are tight fitting, and surfaces are free of marks, gouges, burns and voids</li> <li>maintain a record of completed activities within a portfolio.</li> </ul>	



## MODULE CON1140: TURNING OPERATIONS

**Level:** Introductory

**Theme:** Manufacturing Systems (Processes and Applications)

**Prerequisite:** CON1130 Solid Stock Construction

**Module Description:** Students use wood-turning equipment and techniques to create a faceplate and spindle turning made from solid and/or built-up stock.

**Module Parameters:** Access to a materials work centre, complete with basic hand and power tools, and to instruction from an individual with specialized training in the use of power tools.

**Supporting Module:** CON1120 Project Management

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"><li>operate, safely, a power wood lathe</li></ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"><li>demonstration of the safe set-up, use and shut-down procedures. <i>Assessment Tool</i> <i>Equipment Checklist: Wood Lathe, CONEQUIP-3</i> <i>Standard</i> <i>All procedures are performed according to standard lathe practice and specific recommendations of the lathe manufacturer</i></li></ul>	15
<ul style="list-style-type: none"><li>apply drawing and transfer skills to prepare a full-size pattern or template</li></ul>	<ul style="list-style-type: none"><li>preparation of a full-size pattern or template. <i>Standard</i> <i>The pattern and/or template is to be within <math>\pm 1</math> mm of the original plan or object</i> <i>Performance rating of 2 for each applicable task</i></li></ul>	15
<ul style="list-style-type: none"><li>produce a faceplate and spindle turning, using solid or built-up stock</li></ul>	<ul style="list-style-type: none"><li>demonstration of accepted material preparation and wood-turning skills. <i>Assessment Tool</i> <i>Assessment Framework: Project Assessment, CONPRO</i> <i>Standard</i> <i>The turnings should be within <math>\pm 2</math> mm of the original drawing or free formed according to accepted design principles. The product should be free of major production defects (machining marks, gouges, burns and voids)</i> <i>Performance rating of 2 for each applicable task</i></li></ul>	70

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## MODULE CON1140: TURNING OPERATIONS (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p>Orientation</p> <ul style="list-style-type: none"> <li>Health and Safety</li> <li>Materials</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>identify and demonstrate the safe use and operation of the wood lathe</li> <li>identify the common lathe chisels and accessories associated with wood turning</li> <li>describe recommended tools and accessories for faceplate and spindle turning</li> <li>identify and describe accepted work piece mounting and supporting techniques</li> <li>describe the turning characteristics of a number of common woods</li> <li>identify finishes and finishing procedures suitable for common turned products.</li> </ul>	<p>Discuss the need for properly maintained tools, dust control equipment and the use of personal protective equipment.</p>
<p>Planning and Management</p> <ul style="list-style-type: none"> <li>Product Design</li> </ul>	<ul style="list-style-type: none"> <li>select, modify or design a faceplate and/or spindle-type product that incorporates three or more different types of cuts</li> <li>create a full-size pattern or template</li> </ul>	<p>It is recommended that students complete CONEQUIP-3: Wood Lathe Equipment Checklist prior to the use of this piece of equipment.</p>



## MODULE CON1140: TURNING OPERATIONS (continued)

Concept	Specific Learner Expectations	Notes
<ul style="list-style-type: none"> <li>Estimating</li> <li>Event Sequencing</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>prepare a material list and cost estimate</li> <li>show a sequence of operations that facilitates the safe and efficient use of materials, tools and equipment</li> <li>calculate the appropriate turning speeds using tables.</li> </ul>	<p>Demonstrate proper procedures and sequence of events to produce:</p> <ul style="list-style-type: none"> <li>– straight and taper cuts</li> <li>– coves and Vs</li> <li>– beads and shoulders</li> <li>– concave and convex surface.</li> </ul>
<p>Implementation</p> <ul style="list-style-type: none"> <li>Lathe Work</li> </ul>	<ul style="list-style-type: none"> <li>demonstrate the appropriate skills to: <ul style="list-style-type: none"> <li>– prepare stock for turning</li> <li>– lay out and size a rough turning</li> <li>– rough cut and finish cut according to a predetermined pattern/template or free forming principles</li> <li>– sand and apply the recommended finish</li> <li>– remove and assemble finished product.</li> </ul> </li> </ul>	<p>Discuss free forming principles used by artisans and the use of copy lathes and automated equipment used in industry.</p>
<p>Assessment</p> <ul style="list-style-type: none"> <li>Quality Control</li> <li>Career Preparation</li> </ul>	<ul style="list-style-type: none"> <li>complete a visual inspection of a product to determine whether the structure is sound, surfaces are free of scratches, gouges, burns and voids</li> <li>demonstrate efficient methods to improve quality and productivity</li> <li>maintain a record of completed activities within a portfolio.</li> </ul>	



## MODULE CON1160: MANUFACTURED MATERIALS

**Level:** Introductory

**Theme:** Manufacturing Systems (Processes and Applications)

**Prerequisite:** CON1010 Basic Tools & Materials

**Module Description:** Students select and use the appropriate materials and tools to build a product or structure from a wood composite or other manufactured material.

**Module Parameters:** Access to a materials work centre, complete with basic hand and power tools, and to instruction from an individual with specialized training in the use of power tools.

**Supporting Module:** CON1120 Project Management

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"><li>identify and describe the characteristics of common manufactured materials</li></ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"><li>identification and description of a variety of common manufactured sheet materials.  <i>Assessment Tool</i> <i>Response Assessment: Characteristics of Manufactured Materials, CON1160-1</i>  <i>Standard</i> <i>The accurate identification and description of four different manufactured sheet products</i> <i>Response rating of 1</i></li></ul>	15
<ul style="list-style-type: none"><li>demonstrate the safe use of a given hand and power tool</li></ul>	<ul style="list-style-type: none"><li>safe set-up, use and shut-down procedures related to the safe use of one or more stationary/portable power tools.  <i>Assessment Tool</i> <i>Use the appropriate power tools performance check list such as:</i> <i>Equipment Checklist: Drill Press, CONEQUIP-1</i> <i>Equipment Checklist: Bandsaw, CONEQUIP-2</i>  <i>Standard</i> <i>All procedures of operation are performed according to standard practice and specific recommendations of the equipment manufacturer</i></li></ul>	15

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Introductory

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## MODULE CON1160: MANUFACTURED MATERIALS (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>create a product from a manufactured material, using basic joinery techniques</li> <li>demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>demonstration of basic joinery skills and processes to construct a product from manufactured materials.</li> </ul> <p><i>Assessment Tool</i>  <i>Project Assessment: Building with Manufactured Materials, CON1160-2</i>  <i>Illustrative Example: Portable Work Bench, CON1160-3</i></p> <p><i>Standard</i>  <i>The product should be constructed according to the working drawing and event sequence. Joints are to be tight fitting; surface should be free of marks, and edges treated appropriately</i>  <i>Performance rating of 1 for each applicable task</i></p> <ul style="list-style-type: none"> <li>observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>70</p> <p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p>Orientation</p> <ul style="list-style-type: none"> <li>Materials</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>identify the various types of manufactured materials; e.g.: <ul style="list-style-type: none"> <li>plywood</li> <li>hardboard</li> <li>particle board</li> </ul> </li> <li>describe how a common manufactured material is made</li> <li>explain the advantages of using manufactured materials</li> </ul>	<p>Because of the many types of manufactured materials available, students need to understand how they are best used.</p>



# MODULE CON1160: MANUFACTURED MATERIALS (continued)

Concept	Specific Learner Expectations	Notes
<ul style="list-style-type: none"> <li>Construction Processes</li> <li>Tool Safety</li> <li>Finishing</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>describe typical methods of constructing a product from a manufactured material; e.g.:               <ul style="list-style-type: none"> <li>types of joints</li> <li>fastening systems</li> <li>edge treatments</li> </ul> </li> <li>identify the factors that determine the quality of a wood joint</li> <li>describe the safe operation of hand and power tools to make dado, rabbet and miter joints in plywood and other manufactured materials</li> <li>identify and describe common methods used to finish plywood and other wood substitutes.</li> </ul>	<p>Discuss how the type of joint affects the overall strength, usefulness and appearance of a product.</p> <p>Note the advantages of using KD (knock down) joints and hardware used in many of today's products.</p>
Planning and Management	<ul style="list-style-type: none"> <li>select or modify a plan for a project that incorporates basic joinery and edge treatment techniques</li> <li>create a bill of materials, cutting list and event sequence.</li> </ul>	<p>Have students consider a project such as a:</p> <ul style="list-style-type: none"> <li>tool box</li> <li>portable work bench</li> <li>shelving unit</li> <li>speaker enclosure</li> <li>storage unit.</li> </ul>
<p>Implementation</p> <ul style="list-style-type: none"> <li>Material Processing</li> </ul>	<ul style="list-style-type: none"> <li>use the appropriate tools, materials and processes to:               <ul style="list-style-type: none"> <li>measure and lay out the components</li> <li>cut to size and surface all edges</li> <li>edge bond all exposed surfaces as required</li> <li>machine the appropriate joints</li> <li>assemble and clamp</li> <li>attach the appropriate hardware</li> <li>prepare for finishing</li> <li>apply a suitable finish.</li> </ul> </li> </ul>	<p>Discuss the importance of sizing all parts before laying out and cutting the joints.</p>



**MODULE CON1160: MANUFACTURED MATERIALS (continued)**

Concept	Specific Learner Expectations	Notes
<p>Assessment</p> <ul style="list-style-type: none"><li>• Quality Control</li><li>• Career Preparation</li></ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"><li>• conduct a visual inspection of components to see that the joints are tight fitting, surfaces are free of marks, edges are covered and finished appropriately</li><li>• maintain a record of completed activities within a portfolio.</li></ul>	



## MODULE CON1180: MOLD MAKING & CASTING

**Level:** Introductory

**Theme:** Manufacturing Systems (Processes and Applications)

**Prerequisite:** CON1010 Basic Tools & Materials

**Module Description:** Students apply knowledge of casting and molding materials and processes to prepare a mold and produce a casting.

**Module Parameters:** Access to a materials work centre complete with molding and casting equipment.

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"><li>list and describe common materials and processes used in casting/molding</li></ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"><li>identification and description of common casting/molding materials and processes. <i>Assessment Tool</i> <i>Response Assessment: Characteristics of Casting/Molding Materials, CON1180-1</i> <i>Standard</i> <i>The accurate identification and description of three different casting materials such as clay slip, concrete and plastic</i> <i>Response rating of 1</i></li></ul>	10
<ul style="list-style-type: none"><li>apply principles of pattern making to create a simple mold</li></ul>	<ul style="list-style-type: none"><li>demonstration of pattern and mold-making skills to produce a simple pattern and mold. <i>Assessment Tool</i> <i>Assessment Framework: Project Assessment, CONPRO</i> <i>Standard</i> <i>Patterns or molds are made from the appropriate materials and allows for convenient pouring and extraction of the final product</i> <i>Performance rating of 1 for each applicable task</i></li></ul>	45

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## MODULE CON1180: MOLD MAKING & CASTING (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>cast and finish a product, using the appropriate skills, materials and processes</li> <li>demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>demonstration of casting or molding skills to produce a simple molding or casting.</li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Framework: Project Assessment, CONPRO</i></p> <p><i>Standard</i>  <i>Casting/moldings should be free of voids; meet the stated specifications related to size, shape and quality of finish</i>  <i>Performance rating of 1 for each applicable task</i></p> <ul style="list-style-type: none"> <li>observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>45</p> <p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p>Orientation</p> <ul style="list-style-type: none"> <li>Casting and Molding</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>identify and describe materials used to cast/mold such as: <ul style="list-style-type: none"> <li>clay slip</li> <li>concrete</li> <li>polystyrene beads</li> <li>plastisol</li> <li>model metal</li> </ul> </li> <li>describe common processes of casting/molding clay, concrete and plastic</li> <li>differentiate between hardening by cooling, curing and drying</li> </ul>	<p>Investigate process related to:</p> <ul style="list-style-type: none"> <li>slip casting</li> <li>pre-cast concrete</li> <li>injection molding</li> <li>rotational molding</li> <li>dip molding.</li> </ul>



## MODULE CON1180: MOLD MAKING &CASTING (continued)

Concept	Specific Learner Expectations	Notes
<ul style="list-style-type: none"> <li>Health and Safety</li> <li>Pattern and Mold Making</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>identify and describe the health and safety hazards associated with heating plastic and firing ceramic products</li> <li>describe the kinds of materials and methods that are used to make patterns and molds.</li> </ul>	<p>Ensure that there is adequate ventilation when heating plastic and firing ceramic materials.</p> <p>Discuss ethical issues related to copying existing products.</p>
<p>Planning and Management</p> <ul style="list-style-type: none"> <li>Mold Design</li> <li>Casting and Molding</li> </ul>	<ul style="list-style-type: none"> <li>design or prepare a mold for a ceramic or plastic product</li> <li>calculate the quantities of materials required to make a casting</li> <li>prepare a detailed step-by-step set of procedures to make a cast or molded product</li> <li>locate the necessary personal protective clothing and equipment for a specific casting/molding process</li> <li>describe a plan of action in the event of an accident.</li> </ul>	<p>Students will need to consider ways to secure the mold, pour and extract the product.</p>
<p>Implementation</p> <ul style="list-style-type: none"> <li>Material Processing</li> <li>Health and Safety</li> </ul>	<ul style="list-style-type: none"> <li>use the appropriate tools, materials and processes to: <ul style="list-style-type: none"> <li>– make or prepare a mold</li> <li>– measure and mix quantities of materials</li> <li>– pour, cure and finish a cast and/or molded product</li> </ul> </li> <li>use the appropriate personal protective equipment.</li> </ul>	



**MODULE CON1180: MOLD MAKING & CASTING (continued)**

Concept	Specific Learner Expectations	Notes
<b>Assessment</b> <ul style="list-style-type: none"><li>• Quality Control</li><li>• Career Information</li><li>• Career Preparation</li></ul>	<i>The student should:</i> <ul style="list-style-type: none"><li>• describe factors that affect the quality of a cast or molded product</li><li>• list potential career opportunities related to casting and molding</li><li>• maintain a record of completed activities within a portfolio.</li></ul>	Have students note that there is a very close relationship between the quality of a mold and the quality of the finished product.



## MODULE CURRICULUM AND ASSESSMENT STANDARDS:

### SECTION E: INTERMEDIATE LEVEL

The following pages define the curriculum and assessment standards for the intermediate level of Construction Technologies.

Intermediate level modules help students build on the competencies developed at the introductory level and focus on developing more complex competencies. They provide a broader perspective, helping students recognize the wide range of related career opportunities available within the strand.

Module CON2010:	Site Preparation .....	E.3
Module CON2020:	Concrete Forming .....	E.7
Module CON2030:	Alternate Foundations .....	E.11
Module CON2040:	Framing Systems 1 (Floor & Wall) .....	E.15
Module CON2050:	Roof Structures 1 (Framing & Finishing) .....	E.19
Module CON2060:	Exterior Finishing (Door, Window & Siding) .....	E.23
Module CON2070:	Electrical Systems .....	E.27
Module CON2080:	Plumbing Systems .....	E.31
Module CON2090:	Climate Control Systems .....	E.35
Module CON2100:	Agri-structures .....	E.39
Module CON2120:	Multiple Materials .....	E.43
Module CON2130:	Furniture Making 1 (Box Construction) .....	E.47
Module CON2140:	Furniture Making 2 (Frame & Panel) .....	E.51
Module CON2150:	Finishing & Refinishing .....	E.55
Module CON2160:	Cabinetmaking 1 (Web & Face Frame) .....	E.59
Module CON2170:	Cabinetmaking 2 (Door & Drawer) .....	E.63
Module CON2180:	Wood Forming .....	E.67
Module CON2190:	Manufacturing Systems .....	E.71
Module CON2200:	Product Development .....	E.75



## MODULE CON2010: SITE PREPARATION

**Level:** Intermediate

**Theme:** Building Systems (Processes and Applications)

**Prerequisite:** CON1070 Building Construction

**Module Description:** Students develop the knowledge and skills to acquire a building permit and to locate and prepare a site for excavation and foundation work.

**Module Parameters:** Access to a building site and/or construction facility and to instruction from an individual with specialized training in carpentry.

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"><li>identify and describe typical building site layout and excavation processes</li></ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"><li>presentation of an independently researched report that includes:<ul style="list-style-type: none"><li>identification and use of batterboards, building lines, plumb bob, builder's level and transit</li><li>use of the 3, 4, 5 principle (Pythagorean Theorem)</li><li>description of excavation methods and equipment</li><li>safety precautions with an emphasis on shoring.</li></ul></li></ul> <i>Assessment Tool</i> <i>Research Process: Preparing a Building Site, CON2010-1</i>	15
<ul style="list-style-type: none"><li>complete an application for a building permit</li></ul>	<i>Standard</i> <i>Performance rating of 2 for each applicable task</i> <ul style="list-style-type: none"><li>completion of a building permit using a recognized form that includes all information required to meet local building standards</li></ul>	15
<ul style="list-style-type: none"><li>apply site preparation skills to assist in the location of building site lines and features</li></ul>	<ul style="list-style-type: none"><li>demonstration of site preparation and teamwork skills to:<ul style="list-style-type: none"><li>establish building lines using batterboards and plumb bobs</li><li>lay out building features using a builder's level or transit and the 3, 4, 5 squaring method.</li></ul></li></ul> <i>Assessment Tool</i> <i>Activity Assessment: Building Site Layout, CON2010-2</i>	70
	<i>Standard</i> <i>Specific dimensions are within <math>\pm 3</math> mm over 6 metres</i> <i>Performance rating of 2 for each applicable task</i>	



## MODULE CON2010: SITE PREPARATION (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p>Orientation</p> <ul style="list-style-type: none"> <li>Building Regulations</li> <li>Site Selection</li> <li>Site Layout</li> <li>Lay Out Tools</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>explain the purpose of local, provincial and national building regulations</li> <li>identify local zoning regulations that limit the type, size and location of new buildings</li> <li>identify the parameters for selecting a building site</li> <li>describe a typical method of establishing lot and building lines as well as grade levels</li> <li>explain the use of a plumb bob, builder's level, transit and string line.</li> </ul>	<p>Point out that in addition to structural regulations, building codes also deal with fire and health issues.</p> <p>Students should be able to use the 3–4–5 rule, builder's level, transit and batterboards.</p> <p>Discuss other methods of leveling such as hydro and laser levelling techniques.</p>
<p>Planning and Management</p> <ul style="list-style-type: none"> <li>Estimating</li> <li>Worker Safety</li> </ul>	<ul style="list-style-type: none"> <li>identify the information that is needed to complete an application for a building permit</li> <li>use site plan and elevation drawings to determine the amount of soil to be excavated</li> <li>locate and mark all underground and overhead services</li> <li>identify soil conditions that may require shoring.</li> </ul>	<p>Discuss the importance of having the utility companies mark the location of all underground services.</p>



## MODULE CON2010: SITE PREPARATION (continued)

Concept	Specific Learner Expectations	Notes
<b>Implementation</b> <ul style="list-style-type: none"> <li>• Building Layout</li> </ul>	<i>The student should:</i> <ul style="list-style-type: none"> <li>• use an approved method to: <ul style="list-style-type: none"> <li>– position batterboards</li> <li>– locate lot and building lines</li> <li>– excavate</li> <li>– establish locations and elevations for wall and pier footings.</li> </ul> </li> </ul>	<p>This work can be simulated if a construction site is not available. In this case, a tour of a construction site will enhance this module.</p>
<b>Assessment</b> <ul style="list-style-type: none"> <li>• Career Information</li> <li>• Career Preparation</li> </ul>	<ul style="list-style-type: none"> <li>• identify career opportunities related to the work of a/an: <ul style="list-style-type: none"> <li>– developer</li> <li>– urban planner</li> <li>– surveyor</li> <li>– excavator</li> </ul> </li> <li>• maintain a record of completed activities within a portfolio.</li> </ul>	



## MODULE CON2020: CONCRETE FORMING

**Level:** Intermediate

**Theme:** Building Systems (Processes and Applications)

**Prerequisite:** CON1070 Building Construction

**Module Description:** Students develop knowledge and skills related to the preparation and construction of a concrete foundation.

**Module Parameters:** Access to a building site and/or construction facility and to instruction from an individual with specialized training in carpentry.

**Supporting Module:** CON2010 Site Preparation

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"><li>list and describe factors that affect footing and wall design</li><li>identify and describe common forming materials and processes</li></ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"><li>a written or oral response that correctly identifies factors that affect footing and wall design, types of forms, form materials, ties and release agents.  <i>Assessment Tool</i> <i>Response Assessment: Concrete Forming, CON2020–1</i>  <i>Standard</i> <i>Terminology should be consistent with that used in Canadian Wood-Frame House Construction</i> <i>Response rating of 2</i></li></ul>	25
<ul style="list-style-type: none"><li>apply concrete forming skills to assist in forming and placing a concrete foundation</li></ul>	<ul style="list-style-type: none"><li>the completion of a project that incorporates full-size formwork or development of a scale model.  <i>Assessment Tool</i> <i>Activity Assessment: Concrete Forming and Placing, CON2020–2</i>  <i>Standard</i> <i>Installation of forms is consistent with accepted trade practice. Components are assembled to meet overall specifications to a tolerance of <math>\pm 3</math> mm over 6 metres. Forms are reinforced to maintain their position during placement. The concrete is consolidated to prevent honeycombing and is finished appropriate to the floor system. The concrete is allowed to cure properly before stripping in a manner that preserves the integrity of the footing and wall section</i> <i>Performance rating of 2 for each applicable task</i></li></ul>	75



## MODULE CON2020: CONCRETE FORMING (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p>Orientation</p> <ul style="list-style-type: none"> <li>Soil Condition</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>describe how soils are tested for: <ul style="list-style-type: none"> <li>resistance to penetration</li> <li>shear resistance</li> <li>moisture content</li> </ul> </li> <li>explain how soil, water and frost conditions affect the design and construction of a foundation as well as excavation and safety procedures</li> </ul>	<p>Discuss the load-bearing strengths of different soil types and explain how the strengths affect the footing design.</p>
<ul style="list-style-type: none"> <li>Footing and Wall Forming</li> </ul>	<ul style="list-style-type: none"> <li>explain the purpose of a footing</li> <li>describe one or more common techniques to form footings, walls and piers</li> <li>describe methods of reinforcing a footing and wall section</li> <li>identify the parts of a typical concrete wall form</li> <li>explain the difference between box-sill and cast-in-place construction</li> <li>identify release agents and coatings used on forms</li> </ul>	<p>Explain why footings must be monoliths and be located below the frost line whenever possible.</p> <p>Investigate the use of built-in-place and prefabricated forming systems.</p> <p>Examine methods used to create corner assemblies and to secure the kickplate.</p>



## MODULE CON2020: CONCRETE FORMING (continued)

Concept	Specific Learner Expectations	Notes
<ul style="list-style-type: none"> <li>Concrete Mixer</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>describe types of cement and concrete mixers used in footing and wall systems.</li> </ul>	
<p>Planning and Management</p> <ul style="list-style-type: none"> <li>Print Reading</li> <li>Estimating</li> </ul>	<ul style="list-style-type: none"> <li>describe factors that determine the size and strength of a footing and wall components</li> <li>prepare a detailed list of materials and supplies to form a footing and wall</li> <li>calculate the volume of concrete required for a footing and wall component.</li> </ul>	
<p>Implementation</p> <ul style="list-style-type: none"> <li>Form Work, Concrete Placement and Finishing</li> </ul>	<ul style="list-style-type: none"> <li>use the appropriate tools and materials to: <ul style="list-style-type: none"> <li>construct a set of forms for a rectangular footing and wall section</li> <li>square level, align and brace</li> <li>place, consolidate and finish a concrete footing and wall section</li> <li>make provisions to attach a sill plate if necessary</li> <li>seal walls below ground level and install weeping tile</li> <li>back file taking account lateral pressure.</li> </ul> </li> </ul>	<p>Note the importance of wearing personal protective equipment while on the work site.</p>
<p>Assessment</p> <ul style="list-style-type: none"> <li>Career Information</li> <li>Career Preparation</li> </ul>	<ul style="list-style-type: none"> <li>identify opportunities for training and business ventures related to concrete forming, placing and finishing</li> <li>maintain a record of completed activities within a portfolio.</li> </ul>	<p>Discuss alternative methods of building a concrete foundation using unit masonry, precast and polystyrene blocks.</p>



## MODULE CON2030: ALTERNATE FOUNDATIONS

**Level:** Intermediate

**Theme:** Building Systems (Processes and Applications)

**Prerequisite:** CON1070 Building Construction

**Module Description:** Students develop basic knowledge and skills related to the design and construction of an alternative foundation system.

**Module Parameters:** Access to a building site and/or construction facility and to instruction from an individual with specialized training in carpentry.

**Supporting Module:** CON2020 Concrete Forming

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"><li>identify and describe the components of an alternative foundation system</li><li>identify the health hazards and precautions related to the use of engineered materials</li><li>apply construction skills to assist in the design/construction of an alternative foundation system</li></ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"><li>a written or oral presentation that correctly identifies the materials and design features of one or more alternate foundations systems</li></ul> <p style="text-align: center;"><i>and</i></p> <ul style="list-style-type: none"><li>knowledge of product labels for safe use and disposal of alternate foundations materials.</li></ul> <p><i>Assessment Tool</i> <i>Presentations/Reports: Wood Foundations, CON2030-1</i></p> <p><i>Standard</i> <i>Performance rating of 2 for each applicable task</i></p>	25
	<ul style="list-style-type: none"><li>observation of the construction and placement of an alternate foundation or display model.</li></ul> <p><i>Assessment Tool</i> <i>Activity Assessment: Wood Foundation Framing, CON2030-2</i></p> <p><i>Standard</i> <i>Foundation/display model is built according to local code requirements, components are assembled and appropriately braced. Walls are moisture proofed and correctly back filled. Overall dimensions are within <math>\pm 3</math> mm over 6 meters</i> <i>Performance rating of 2 for each applicable task</i></p>	75



# **MODULE CON2030: ALTERNATE FOUNDATIONS (continued)**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p><b>Orientation</b></p> <ul style="list-style-type: none"> <li>Alternate Systems and Materials</li> <li>Related Building Codes</li> <li>System Design</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>describe alternate foundation systems and materials such as: <ul style="list-style-type: none"> <li>concrete masonry block</li> <li>preserved wood</li> <li>foam form</li> </ul> </li> <li>identify local building codes that pertain to the design and construction of alternate foundations systems</li> <li>label and describe the parts of a typical preserved wood, masonry block and/or foam form foundation</li> <li>list and describe the factors that determine the design and construction of a footing and wall section for one or more alternate systems</li> <li>describe levelling and plumbing techniques that are used with a particular foundation system</li> <li>describe recommended methods that are used to control drainage and damp-proof an alternate foundation system</li> <li>describe the flooring options that can be used with an alternate foundation system.</li> </ul>	<p>Discuss the advantages and disadvantages of using an alternate foundation system.</p> <p>Explain why walls should be designed to take advantage of block/sheet sizes.</p> <p>Discuss typical methods to attach a sill plate to a given wall system.</p>



## MODULE CON2030: ALTERNATE FOUNDATIONS (continued)

Concept	Specific Learner Expectations	Notes
<b>Planning and Management</b> <ul style="list-style-type: none"> <li>• Structural Design</li> <li>• Health and Safety</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• prepare a sketch of an alternate foundation that identifies construction details, size and spacing of component, as well as sealing, drainage and damp-proofing features</li> <li>• identify suitable personal protective equipment and recommended procedures related to the use of alternate materials</li> <li>• describe suitable methods used to dispose of scrap materials.</li> </ul>	<p>Review the safe use of power tools common to construction activities.</p> <p>Refer to product labels and material safety data sheets for appropriate directions when using wood preservatives.</p> <p>Students should avoid prolonged inhalation of dust. Wood preservatives should not be allowed to come in contact with skin or food.</p> <p>Treated wood and foam scraps should not be burned in open fires or fireplaces.</p>
<b>Implementation</b>	<ul style="list-style-type: none"> <li>• use the appropriate tools, materials and processes to: <ul style="list-style-type: none"> <li>– level the footings and create the necessary drainage system</li> <li>– lay out and assemble the wall section</li> <li>– seal joints and apply a vapour seal/damp-proofing</li> <li>– backfill without damaging the moisture barrier.</li> </ul> </li> </ul>	<p>Discuss the safe use of liquid preservatives.</p>
<b>Assessment</b> <ul style="list-style-type: none"> <li>• Career Information</li> <li>• Career Preparation</li> </ul>	<ul style="list-style-type: none"> <li>• identify opportunities for entrepreneurial ventures and further training associated with alternate foundation systems</li> <li>• maintain a record of completed activities within a portfolio.</li> </ul>	



## MODULE CON2040: FRAMING SYSTEMS 1 (FLOOR & WALL)

**Level:** Intermediate

**Theme:** Building Systems (Processes and Applications)

**Prerequisite:** CON1070 Building Construction

**Module Description:** Students develop basic framing knowledge and skills associated with the construction of a floor and wall system.

**Module Parameters:** Access to a building site and/or construction facility and to instruction from an individual with specialized training in carpentry.

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"><li>identify and describe the parts of a floor and wall framing system</li></ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"><li>a written or oral response that correctly identifies and describes:<ul style="list-style-type: none"><li>floor and wall framing components</li><li>framing techniques.</li></ul></li></ul> <i>Assessment Tool</i> <i>Response Assessment: Floor and Wall Framing, CON2040-1</i> <i>Standard</i> <i>Response rating of 2</i>	20
<ul style="list-style-type: none"><li>read and interpret the appropriate drawings and specifications to create a floor and wall framing and sheathing estimate</li></ul>	<ul style="list-style-type: none"><li>a detailed list and cost of materials taken from a given working drawing of a floor and wall component.</li></ul> <i>Assessment Tool</i> <i>Activity Assessment: Floor and Wall Framing, CON2040-2</i> <i>Standard</i> <i>Estimate includes allowances for floor and wall openings, over-run and waste considerations</i> <i>Performance rating of 2 for each applicable task</i>	20



# **MODULE CON2040: FRAMING SYSTEMS 1 (FLOOR & WALL) (continued)**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• apply framing skills to assist in the layout and construction of floor and wall components</li> <li>• demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• the observation of framing skills through on-site, in-shop or mock-up work.</li> </ul> <p><i>Assessment Tool</i>  <i>Activity Assessment: Floor and Wall Framing, CON2040-2</i></p> <p><i>Standard</i>  <i>The floor and wall components are framed according to conventional building practices and specified dimensions are within <math>\pm 3</math> mm over 6 metres</i>  <i>Performance rating of 2 for each applicable task</i></p> <ul style="list-style-type: none"> <li>• observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>60</p> <p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p>Orientation</p> <ul style="list-style-type: none"> <li>• Materials</li> <li>• Fasteners</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• describe common wood defects associated with natural growth and milling operations</li> <li>• compare the span limitations of different species and grades of lumber and manufactured components</li> <li>• identify common types of sheathing and subflooring materials</li> <li>• identify the adhesives and fasteners used in conjunction with floor and wall framing</li> </ul>	<p>If a framing project requires more than 25 hours, or is more advanced, add a project module from Career Transitions or combine with CON3210: Framing Systems 2 (Floor, Wall &amp; Ceiling)</p>



**MODULE CON2040: FRAMING SYSTEMS 1 (FLOOR & WALL) (continued)**

Concept	Specific Learner Expectations	Notes
<ul style="list-style-type: none"> <li>Floor and Wall Structures</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>identify the parts and purpose of a typical wall and floor framing system</li> <li>compare platform framing to post and beam construction</li> <li>describe the consequences of a floor system that has not been sized or constructed properly</li> <li>identify and describe the proper use of portable electric and air activated tools.</li> </ul>	<p>Discuss the relationship of the floor and wall design to the overall strength and stability of a building.</p>
<p>Planning and Management</p> <ul style="list-style-type: none"> <li>Floor and Wall Design</li> <li>Estimating</li> </ul>	<ul style="list-style-type: none"> <li>use a frame structure drawing to determine the location, type and sizes of joists, beams, sills and headers as well as subflooring requirements</li> <li>use a wall frame elevation to determine the size and locations of studs, headers and rough size openings</li> <li>prepare a quantity survey for a floor and wall section.</li> </ul>	
<p>Implementation</p> <ul style="list-style-type: none"> <li>Health and Safety</li> <li>Tools and Processes</li> </ul>	<ul style="list-style-type: none"> <li>demonstrate proper methods of lifting materials and components</li> <li>use proper personal protective equipment</li> <li>cover openings and build railings where needed</li> <li>use the appropriate hand tools and portable equipment to: <ul style="list-style-type: none"> <li>lay out components</li> <li>cut and assemble floor joists and wall sections</li> <li>square floor and wall components</li> <li>install subflooring and sheathing</li> <li>lay out and assemble a wall section</li> <li>erect, plumb and brace wall sections.</li> </ul> </li> </ul>	<p>Emphasize the importance of safety on the work site.</p> <p>Review the safe use of air and electrically operated tools.</p>



**MODULE CON2040: FRAMING SYSTEMS 1 (FLOOR & WALL) (continued)**

Concept	Specific Learner Expectations	Notes
<b>Assessment</b> <ul style="list-style-type: none"><li>• Career Information</li><li>• Career Preparation</li></ul>	<i>The student should:</i> <ul style="list-style-type: none"><li>• identify the trade qualifications and employment opportunities related to residential framing</li><li>• maintain a record of completed activities within a portfolio.</li></ul>	



## MODULE CON2050: ROOF STRUCTURES 1 (FRAMING & FINISHING)

**Level:** Intermediate

**Theme:** Building Systems (Processes and Applications)

**Prerequisite:** CON1070 Building Construction

**Module Description:** Students develop basic knowledge and skills associated with framing and finishing a simple roof system.

**Module Parameters:** Access to a building site and/or construction facility and to instruction from an individual with specialized training in carpentry.

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"><li>identify and describe the different styles and parts of a roof system</li></ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"><li>a written or oral response that correctly identifies and describes basic roof styles and roofing components. <i>Assessment Tool</i> <i>Response Assessment: Roof Construction, CON2050-1</i> <i>Standard</i> <i>Response rating of 2</i></li></ul>	10
<ul style="list-style-type: none"><li>read and interpret the appropriate drawings and specifications to create a roof framing and finishing estimate</li></ul>	<ul style="list-style-type: none"><li>description and quantities of materials required to frame, sheath and apply a finished covering on a typical roof. <i>Assessment Tool</i> <i>Activity Assessment: Roof Construction, CON2050-2</i> <i>Standard</i> <i>Estimate includes all allowances for roof openings, over-run and waste requirements</i> <i>Performance rating of 2 for each applicable task</i></li></ul>	20

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# **MODULE CON2050: ROOF STRUCTURES 1 (FRAMING & FINISHING) (continued)**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• apply roofing skills to assist in the framing and finishing of a roof structure</li> <li>• demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• demonstration of framing and finishing skills.</li> </ul> <p><i>Assessment Tool</i>  <i>Activity Assessment: Roof Construction, CON2050–2</i></p> <p><i>Standard</i>  <i>The roof is framed and covered according to conventional building practice. Specified dimensions are within <math>\pm 3</math> mm over 6 metres</i>  <i>Performance rating of 2 for each applicable task</i></p> <ul style="list-style-type: none"> <li>• observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>70</p> <p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p>Orientation</p> <ul style="list-style-type: none"> <li>• Roof Structures</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• list and describe the common styles of roofs</li> <li>• define roof terms such as span, run, rise, slope and overhang</li> <li>• describe the parts of a common rafter</li> <li>• describe the parts of a typical roof truss</li> <li>• describe the advantages of using roof trusses versus standard common rafters</li> <li>• list and describe the parts of a boxed cornice</li> <li>• identify sheathing grades and types; joint and nailing patterns</li> <li>• list and describe the types of roof finishes.</li> </ul>	<p>Focus mainly on simple roof structures and coverings in this module. Intersecting roof structures are covered in CON3050: Roof Structures 2 (Framing &amp; Covering).</p> <p>Discuss issues related to the installation of air/vapour barriers and insulation.</p> <p>Refer to building codes for proper sheathing grades, nail sizes and spacing.</p>



**MODULE CON2050: ROOF STRUCTURES 1 (FRAMING & FINISHING) (continued)**

Concept	Specific Learner Expectations	Notes
<b>Planning and Management</b> <ul style="list-style-type: none"> <li>• Roof Design</li> <li>• Estimating</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• make a roof sketch indicating the location of roof trusses, look-out rafters, bridging, fascia headers, boxed cornices and sheathing patterns</li> <li>• prepare a material list specifying: <ul style="list-style-type: none"> <li>– the size, slope and number of roof trusses or common rafters</li> <li>– thickness and quantities of sheathing</li> <li>– quantities of H-clips and metal anchors</li> <li>– style, colour, weight and quantities of asphalt shingles.</li> </ul> </li> </ul>	
<b>Implementation</b> <ul style="list-style-type: none"> <li>• Health and Safety</li> <li>• Tools and Processes</li> </ul>	<ul style="list-style-type: none"> <li>• check condition of ladders before using and observe safe angle ratios</li> <li>• use proper foot and head protection</li> <li>• identify hazards associated with wet or frosty conditions on sloped surfaces</li> <li>• identify safety devices that are used in conjunction with roof construction</li> <li>• use the appropriate tools and equipment to: <ul style="list-style-type: none"> <li>– locate, fasten, square and plumb roof trusses</li> <li>– cut and install common rafters</li> </ul> </li> <li>• install look-outs, fascia and braces</li> <li>• apply sheathing and shingling.</li> </ul>	<p>Discuss methods of temporarily and permanently bracing roof trusses.</p> <p>Demonstrate appropriate methods to lay the ridge cap to minimize wind damage.</p>
<b>Assessment</b> <ul style="list-style-type: none"> <li>• Career Information</li> <li>• Career Preparation</li> </ul>	<ul style="list-style-type: none"> <li>• outline the trade qualifications and employment opportunities related to residential framing and roofing</li> <li>• maintain a record of activities within a portfolio.</li> </ul>	



## MODULE CON2060: EXTERIOR FINISHING (DOOR, WINDOW & SIDING)

**Level:** Intermediate

**Theme:** Building Systems (Processes and Applications)

**Prerequisite:** CON1070 Building Construction

**Module Description:** Students apply and develop basic knowledge of door, window and siding systems and installation skills and procedures.

**Module Parameters:** Access to a building site and/or construction facility and to instruction from an individual with specialized training in carpentry.

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"><li>identify and describe common types of exterior doors, windows and siding materials</li></ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"><li>a written or oral presentation that correctly identifies at least three different exterior doors, exterior window types and siding materials.</li></ul> <i>Assessment Tool</i> <i>Presentations/Reports: Window/Door and Siding Materials, CON2060-1</i> <i>Standard</i> <i>Performance rating of 2 for each applicable task</i>	10
<ul style="list-style-type: none"><li>read and interpret the appropriate drawings and specifications to create a door and window schedule and siding estimate</li></ul>	<ul style="list-style-type: none"><li>development of an accurate exterior door and window schedule and description of materials and quantities of siding required in a given set of plans.</li></ul> <i>Assessment Tool</i> <i>Assessment Framework: Activity Assessment, CONACT</i> <i>Standard</i> <i>Estimate includes all allowances for wall openings, over-run and waste requirements</i> <i>Performance rating of 2 for each applicable task</i>	20



# **MODULE CON2060: EXTERIOR FINISHING (DOOR, WINDOW & SIDING) (continued)**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• apply finishing skills to install a prehung door, a window unit and siding materials</li> <li>• demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• demonstration of door, window and siding systems skills.</li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Framework: Activity Assessment, CONACT</i></p> <p><i>Standard</i>  <i>Doors, windows and siding systems are installed in keeping with accepted trade practice and manufacturers' recommendations</i>  <i>Performance rating of 2 for each applicable task</i></p> <ul style="list-style-type: none"> <li>• observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>70</p> <p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p>Orientation</p> <ul style="list-style-type: none"> <li>• Doors and Windows</li> <li>• Siding Components</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• list and describe common types of exterior doors and windows</li> <li>• identify methods of sizing windows and exterior doors</li> <li>• describe the procedures used to install an exterior door and window</li> <li>• list and describe the components used in conjunction with the installation of vinyl and aluminum siding</li> <li>• describe the purpose and use of building papers and other house wrap materials.</li> </ul>	<p>Explain the advantages and disadvantages of each style of door or window.</p> <p>Stress the importance of making provisions for the siding to expand and contract during heating and cooling.</p>



**MODULE CON2060: EXTERIOR FINISHING (DOOR, WINDOW & SIDING) (continued)**

Concept	Specific Learner Expectations	Notes
<b>Planning and Management</b> <ul style="list-style-type: none"> <li>• Ordering and Estimating</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• use elevation drawings and specifications to develop a door and window schedule</li> <li>• use an elevation drawing to identify the types of siding and cornice materials and estimated amounts.</li> </ul>	<p>Discuss methods used to estimate siding materials.</p>
<b>Implementation</b> <ul style="list-style-type: none"> <li>• Windows and Doors</li> <li>• Exterior Finishes</li> <li>• Health and Safety</li> </ul>	<ul style="list-style-type: none"> <li>• use the appropriate tools and processes to: <ul style="list-style-type: none"> <li>– level, plumb, seal and fasten a prefabricated door and window unit</li> <li>– install exterior finishes</li> <li>– check and secure all scaffolding</li> <li>– observe proper handling and lifting procedures</li> <li>– use appropriate eye and ear protection.</li> </ul> </li> </ul>	<p>Refer to building code regulations.</p>
<b>Assessment</b> <ul style="list-style-type: none"> <li>• Career Information</li> <li>• Career Preparation</li> </ul>	<ul style="list-style-type: none"> <li>• identify employment and entrepreneurial opportunities associated with the supply and installation of windows, doors and exterior finishes</li> <li>• maintain a record of completed activities within a portfolio.</li> </ul>	



## MODULE CON2070: ELECTRICAL SYSTEMS

**Level:** Intermediate

**Theme:** Building Systems (Processes and Applications)

**Prerequisite:** CON1070 Building Construction

**Module Description:** Students apply electrical principles, and develop an understanding of residential electrical code requirements and installation procedures.

**Module Parameters:** Access to a building site and/or construction facility and to instruction from an individual with specialized training in electrical work.

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"><li>list and describe the electrical systems and components associated with residential wiring</li><li>apply wiring principles and code requirements to create a wiring diagram</li></ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"><li>the presentation of a written or oral presentation that identifies and describes the electrical systems found in a typical residence.</li></ul> <i>Assessment Tool</i> <i>Presentation/Reports: Electrical Systems, CON2070-1</i> <i>Standard</i> <i>Performance rating of 2 for each applicable task</i>	10
	<ul style="list-style-type: none"><li>the development of an electrical drawing of a typical room such as a bathroom, living room or bedroom.</li></ul> <i>Assessment Tool</i> <i>Activity Assessment: Branch Wiring, CON2070-2</i> <i>Standard</i> <i>The working drawing uses standard symbols showing the location and type of outlet, light or switch. Connections between switches and lights are shown along with the electrical service entry</i> <i>Performance rating of 2 for each applicable task</i>	20



## MODULE CON2070: ELECTRICAL SYSTEMS (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• apply wiring skills to assist in the installation of a residential wiring system</li> <li>• profile a trade or occupation within the electrical field</li> <li>• demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• installation of an electrical system to include the required switches, lights and outlets found in a typical room.</li> </ul> <p><i>Assessment Tool</i>  <i>Activity Assessment: Branch Wiring, CON2070-2</i></p> <p><i>Standard</i>  <i>Installation meets accepted trade practice and code requirements</i>  <i>Performance rating of 2 for each applicable task</i></p> <ul style="list-style-type: none"> <li>• presentation of an occupation profile that outlines: <ul style="list-style-type: none"> <li>– present and future employment opportunities</li> <li>– training centres and entry requirements</li> <li>– description of occupation and working conditions.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Research Process: Career Opportunities in Electrical Work: CON2070-3</i></p> <p><i>Standard</i>  <i>Performance rating of 2 for each applicable task</i></p> <ul style="list-style-type: none"> <li>• observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>60</p> <p>10</p> <p>Integrated throughout</p>



## MODULE CON2070: ELECTRICAL SYSTEMS (continued)

Concept	Specific Learner Expectations	Notes
<p>Orientation</p> <ul style="list-style-type: none"> <li>Health and Safety</li> <li>Electrical Principles</li> <li>House Wiring Design</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>identify the principal hazards associated with electrical work such as shocks, burns, fire and falls</li> <li>outline methods that are commonly used to prevent contact with a live electric circuit</li> <li>identify the nonconducting extinguishing agents that can be used with electrical fires</li> <li>describe and provide examples of: <ul style="list-style-type: none"> <li>alternating and direct current</li> <li>series and parallel circuits</li> </ul> </li> <li>define the terms and explain the relationships between voltage, amperage and resistance in a typical circuit</li> <li>identify the common types of electrical systems found in a modern home such as lighting, utility, heating, communication and alarm systems</li> <li>describe the symbols that are used to indicate a wall plug, light fixture, range, dryer plug, etc., on an electrical drawing</li> <li>identify the code requirements for installing outlets in a kitchen, bathroom, living room and bedroom</li> <li>list and describe the types of conductors and connection devices that are used in conventional construction</li> <li>identify design and framing requirements when installing electrical fixtures and wires.</li> </ul>	<p>Our familiarity with the use of electricity in our homes can cause us to forget that electricity can be lethal. Stress the importance of electrical safety.</p> <p>Note that the number of uses and demand for electricity in the home has increased significantly over the past decade.</p>
<p>Planning and Management</p> <ul style="list-style-type: none"> <li>Wiring Project</li> <li>Wiring Permit</li> </ul>	<ul style="list-style-type: none"> <li>make a wiring diagram for a typical residential wiring project</li> <li>prepare a list of materials for a wiring project</li> <li>complete an application for a wiring permit.</li> </ul>	<p>Obtain a local wiring permit application form.</p>



**MODULE CON2070: ELECTRICAL SYSTEMS (continued)**

Concept	Specific Learner Expectations	Notes
<p>Implementation</p> <ul style="list-style-type: none"> <li>House Wiring</li> <li>Testing</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>use the appropriate tools, materials to frame and install a typical residential wiring circuit such as a: <ul style="list-style-type: none"> <li>general purpose and split receptacle</li> <li>single-pole and three-way switch</li> <li>ceiling fixture</li> <li>outside outlet</li> <li>service panel</li> </ul> </li> <li>test a circuit for power, grounding and continuity.</li> </ul>	<p>Provide students with wiring frame or mock-up panels to complete tasks.</p> <p>Have students understand the purpose of a GFI circuit breaker and receptacle.</p>
<p>Assessment</p> <ul style="list-style-type: none"> <li>Career Information</li> <li>Career Preparation</li> </ul>	<ul style="list-style-type: none"> <li>identify the employment and business opportunities related to an electrical trade or occupation</li> <li>identify personal interests and abilities related to making realistic career choices</li> <li>maintain a record of completed activities within a portfolio.</li> </ul>	



## MODULE CON2080: PLUMBING SYSTEMS

**Level:** Intermediate

**Theme:** Building Systems (Processes and Applications)

**Prerequisite:** CON1070 Building Construction

**Module Description:** Students develop basic knowledge and skills to fabricate and make repairs to residential drainage, waste, vent (DWV) and water supply systems.

**Module Parameters:** Access to a building site and/or construction facility and to instruction from an individual with specialized training in plumbing.

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"><li>identify and describe the parts of a residential plumbing system</li></ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"><li>a written or oral presentation that correctly identifies the:<ul style="list-style-type: none"><li>components of a water supply system</li><li>drainage, waste and vent components</li><li>types of pipe and fittings used on each of these systems.</li></ul></li></ul> <i>Assessment Tool</i> <i>Presentations/Reports: Common Plumbing Systems, CON2080-1</i> <i>Standard</i> <i>Performance rating of 2 for each applicable task</i>	10
<ul style="list-style-type: none"><li>create a drawing of a water supply, drainage, waste and vent system for a typical plumbing fixture</li></ul>	<ul style="list-style-type: none"><li>a plan for a water supply and DWV system for a household fixture in a bathroom or kitchen.</li></ul> <i>Assessment Tool</i> <i>Activity Assessment: Installing a Plumbing Fixture, CON2080-2</i> <i>Standard</i> <i>The plan is consistent with conventional plumbing practice and code requirements</i>	15



# **MODULE CON2080: PLUMBING SYSTEMS (continued)**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• apply plumbing skills to assist in the installation of a water supply, waste and vent system</li> <li>• profile a trade or occupation within the plumbing field</li> <li>• demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• demonstrations of appropriate work skills related to installation of a plumbing fixture.</li> </ul> <p><i>Assessment Tool</i>  <i>Activity Assessment: Installing a Plumbing Fixture, CON2080-2</i></p> <p><i>Standard</i>  <i>Installation practices should correspond to those accepted in the plumbing industry</i>  <i>Performance rating of 2 for each applicable task</i></p> <ul style="list-style-type: none"> <li>• presentation of an occupation profile that outlines: <ul style="list-style-type: none"> <li>– description of the occupation and working conditions</li> <li>– employment opportunities</li> <li>– training centres and entry requirements.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Research Process: Career Opportunities in Plumbing, CON2080-3</i></p> <p><i>Standard</i>  <i>Performance rating of 2 for each applicable task</i></p> <ul style="list-style-type: none"> <li>• observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>65</p> <p>10</p> <p>Integrated throughout</p>



# **MODULE CON2080: PLUMBING SYSTEMS (continued)**

Concept	Specific Learner Expectations	Notes
<p><b>Orientation</b></p> <ul style="list-style-type: none"> <li>Residential Plumbing Systems</li> <li>Plumbing Design</li> <li>Installation Procedures</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>identify and describe the piping systems in a conventional residence such as water supply, vent, drainage and gas supply</li> <li>examine the principles related to proper sizing, venting, pressures and drainage angles</li> <li>investigate and compare the use of iron, copper, brass and plastic components</li> <li>identify the symbols that are used to depict common fixtures and fittings</li> <li>identify the code requirements for installing a residential plumbing system</li> <li>identify appropriate methods of cutting, iron, copper, steel and plastic pipe</li> <li>describe and demonstrate approved methods of joining pipe using solder, cohesives, mechanical joints and threaded fasteners</li> <li>determine when to use face-to-face, centre-to-centre and shoulder-to-shoulder measurements.</li> </ul>	
<p><b>Planning and Management</b></p> <ul style="list-style-type: none"> <li>Layout</li> <li>Health and Safety</li> </ul>	<ul style="list-style-type: none"> <li>sketch a typical water supply and DWV system for a typical household fixture</li> <li>use a plumbing layout drawing to create a detailed material list and cost estimate</li> <li>locate and use the appropriate fire extinguisher for a given type of fire</li> <li>describe the health hazards associated with the use of solder and plastic adhesives.</li> </ul>	<p>Point out the need to comply with building code regulations.</p>



# **MODULE CON2080: PLUMBING SYSTEMS (continued)**

Concept	Specific Learner Expectations	Notes
<p><b>Implementation</b></p> <ul style="list-style-type: none"> <li>Material and Tool Processes</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>use the appropriate tools, materials and techniques to: <ul style="list-style-type: none"> <li>rough-in a water supply, DWV system</li> <li>pressure-test a supply system</li> <li>install a fixture and connect supply and drainage lines.</li> </ul> </li> </ul>	
<p><b>Assessment</b></p> <ul style="list-style-type: none"> <li>Career Information</li> <li>Career Preparation</li> </ul>	<ul style="list-style-type: none"> <li>outline the trade qualifications and employment opportunities related to the plumbing trade</li> <li>analyze personal interests and abilities related to making realistic career choices</li> <li>maintain a record of completed activities within a portfolio.</li> </ul>	



## MODULE CON2090: CLIMATE CONTROL SYSTEMS

**Level:** Intermediate

**Theme:** Building Systems (Processes and Applications)

**Prerequisite:** CON1070 Building Construction

**Module Description:** Students investigate common heating, ventilating and air conditioning (HVAC) systems and principles, and participate in the installation or maintenance of one of these systems.

**Module Parameters:** Access to a building site and/or construction facility and to instruction from an individual with specialized training in sheet metal and climate control installation/service.

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"><li>list and describe the major components of a typical heating, ventilating and air conditioning system</li></ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"><li>the accurate identification and description of the components given a representation of a typical residential HVAC system.  <i>Assessment Tool</i> <i>Response Assessment: Heating, Ventilating and Cooling Systems, CON2090-1</i>  <i>Standard</i> <i>Response rating of 2</i></li></ul>	10
<ul style="list-style-type: none"><li>prepare a preventive maintenance schedule for a heating, ventilating and/or air conditioning system</li></ul>	<ul style="list-style-type: none"><li>a comprehensive preventive maintenance schedule for a given component within a HVAC system.  <i>Assessment Tool</i> <i>Activity Assessment: Maintaining/Installing a HVAC System, CON2090-2</i>  <i>Standard</i> <i>The schedule should take into account the frequency and amount of use, condition of use and manufacturer's recommendations</i> <i>Performance rating of 2 for each applicable task</i></li></ul>	20



# **MODULE CON2090: CLIMATE CONTROL SYSTEMS (continued)**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• service or install a heating, ventilating and/or air conditioning system</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• demonstration of skills related to the installation and/or servicing of a typical residential HVAC component.</li> </ul> <p><i>Assessment Tool</i>  <i>Activity Assessment: Maintaining/Installing a HVAC System, CON2090-2</i></p> <p><i>Standard</i>  <i>Installation and servicing procedure are performed according to the manufacturer's recommendations</i>  <i>Performance rating of 2 for each applicable task</i></p>	60
<ul style="list-style-type: none"> <li>• profile a trade or occupation within the heating and air conditioning fields</li> </ul>	<ul style="list-style-type: none"> <li>• presentation of an occupation/trade profile that outlines: <ul style="list-style-type: none"> <li>– description of the occupation and working conditions</li> <li>– present and future employment opportunities</li> <li>– training centres and requirements.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Research Process: Career Opportunities in Heating &amp; Air Conditioning, CON2090-3</i></p> <p><i>Standard</i>  <i>Performance rating of 2 for each applicable task</i></p>	10
<ul style="list-style-type: none"> <li>• demonstrate basic competencies.</li> </ul>	<ul style="list-style-type: none"> <li>• observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	Integrated throughout



# MODULE CON2090: CLIMATE CONTROL SYSTEMS (continued)

Concept	Specific Learner Expectations	Notes
<p>Orientation</p> <ul style="list-style-type: none"> <li>Heat Transfer</li> <li>Design</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>research the methods heat is transferred; e.g.: <ul style="list-style-type: none"> <li>convection</li> <li>radiation</li> <li>gravity</li> </ul> </li> <li>identify the parts of a typical HVAC system</li> <li>compare hot water and forced air heating</li> <li>identify and describe the types of warm/cold air distribution systems; e.g.: <ul style="list-style-type: none"> <li>perimeter loop</li> <li>radial</li> <li>trunk and branch</li> </ul> </li> <li>explain how heating systems are sized, number of outlets calculated and locations determined</li> <li>examine a typical heating system and determine how room temperatures are regulated</li> <li>explain the effects on air quality when there is a lack of ventilation</li> <li>identify the service routines that should be followed for a heating and cooling system.</li> </ul>	<p>This module can be effectively combined with the sheet metal modules found in Fabrication Studies.</p> <p>Stress the importance of having a well-designed HVAC system to achieve greater comfort and efficiency.</p> <p>Discuss the effects of window and tree locations on room temperature.</p>
Planning and Management	<ul style="list-style-type: none"> <li>describe the cost-effectiveness of heating with various fuels</li> <li>prepare a layout for a part of a HVAC system</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>prepare a service schedule for HVAC component.</li> </ul>	Discuss the use of computer controls in regulating air temperature.
Implementation	<ul style="list-style-type: none"> <li>assist in the installation of a HVAC system</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>service a component of a HVAC system.</li> </ul>	



**MODULE CON2090: CLIMATE CONTROL SYSTEMS (continued)**

Concept	Specific Learner Expectations	Notes
<b>Assessment</b> <ul style="list-style-type: none"><li>• Career Information</li><li>• Career Preparation</li></ul>	<i>The student should:</i> <ul style="list-style-type: none"><li>• identify employment and further training opportunities related to heating and air conditioning</li><li>• analyze personal interests and abilities related to making realistic career choices</li><li>• maintain a record of completed activities within a portfolio.</li></ul>	



## MODULE CON2100: AGRI-STRUCTURES

**Level:** Intermediate

**Theme:** Building Systems (Processes and Applications)

**Prerequisite:** CON1070 Building Construction

**Module Description:** Students apply construction principles and skills, and use preengineered designs to build a structure to be used for agricultural purposes.

**Module Parameters:** Access to a building site and/or construction facilities and to instruction from an individual with specialized training in carpentry or metal work.

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"><li>• identify the major issues that must be addressed when designing an agri-structure</li><li>• read and interpret the appropriate drawings and specifications to create a material and cost estimate</li><li>• construct a structure for use in agriculture</li></ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"><li>• presentation of a written project brief that identifies and describes the major factors to be considered when designing, planning and constructing an agri-structure, such as:<ul style="list-style-type: none"><li>– human and environmental safety</li><li>– animal comfort and safety</li><li>– crop protection</li><li>– cost of construction</li></ul></li><li>• appropriate design selection, modification or creation of an agri-structure design that meets Alberta Agriculture standards and local code requirements</li><li>• demonstration of appropriate construction and fabrication skills.</li></ul> <p><i>Assessment Tool</i> <i>Project Assessment: Building an Agri-Structure, CON2100-1</i></p> <p><i>Standard</i> <i>The appropriate materials are selected and ordered. The structure should be accurately laid out, assembled and finished according to conventional building practices</i> <i>Performance rating of 2 for each applicable task</i></p>	<p>10</p> <p>20</p> <p>70</p>



# **MODULE CON2100: AGRI-STRUCTURES (continued)**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p>Orientation</p> <ul style="list-style-type: none"> <li>Materials and Structures</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>describe the types of materials and structures used in agriculture businesses</li> <li>list the factors that affect the choice of materials and design of agri-structure such as: <ul style="list-style-type: none"> <li>human and environmental safety standards</li> <li>animal comfort and safety</li> <li>crop protection</li> <li>conditions of use</li> <li>ease of construction and maintenance</li> <li>material cost.</li> </ul> </li> </ul>	<p>This module provides students with the opportunity to apply basic construction principles and practices to farm-type buildings and structures.</p>
<p>Planning and Management</p> <ul style="list-style-type: none"> <li>Structural Designs</li> <li>Estimating and Scheduling</li> </ul>	<ul style="list-style-type: none"> <li>produce/select an agri-structure design that: <ul style="list-style-type: none"> <li>uses two or more types of structural materials</li> <li>applies basic construction principles and processes</li> <li>meets industry standards</li> </ul> </li> <li>estimate the cost of materials and prepare a work schedule.</li> </ul>	



**MODULE CON2100: AGRI-STRUCTURES** (continued)

Concept	Specific Learner Expectations	Notes
Implementation <ul style="list-style-type: none"><li>Material Processing</li></ul>	<i>The student should:</i> <ul style="list-style-type: none"><li>use the appropriate tools materials and processes to construct and finish a structure.</li></ul>	
Assessment <ul style="list-style-type: none"><li>Career Preparation</li></ul>	<ul style="list-style-type: none"><li>maintain a record of completed activities within a portfolio.</li></ul>	



## MODULE CON2120: MULTIPLE MATERIALS

**Level:** Intermediate

**Theme:** Manufacturing Systems (Processes and Applications)

**Prerequisite:** CON1120 Project Management

**Module Description:** Students develop a product that incorporates two or more types of material in its construction.

**Module Parameters:** Access to a fully equipped materials facility and to instruction from an individual with specialized training in the use of common materials and tools.

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"><li>identify advantages of using different materials in a product</li><li>apply knowledge of structural materials, planning, and construction techniques to produce a product from different materials</li></ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"><li>knowledge of the properties of common structural materials and formulation of criteria for using unlike materials for a given application.</li></ul> <i>Assessment Tool</i> <i>Project Assessment: Products from Multiple Materials, CON2120-1</i> <i>Standard</i> <i>Presentation should include the identification of relevant properties and choice based on appearance, serviceability and cost of materials</i> <i>Performance rating of 2 for each applicable task</i>	10
	<ul style="list-style-type: none"><li>the demonstration of production skills to produce a product made from two or more different materials.</li></ul> <i>Assessment Tool</i> <i>Project Assessment: Products from Multiple Materials, CON2120-1</i>	70
	<i>Standard</i> <i>The project should be built using the appropriate materials, joinery and finishing techniques; all joints are to be tight fitting and square; finishes are to be smooth and free from production defects. Overall dimensions should be <math>\pm 2</math> mm</i> <i>Performance rating of 2 for each applicable task</i>	20



# **MODULE CON2120: MULTIPLE MATERIALS (continued)**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>Observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p>Orientation</p> <ul style="list-style-type: none"> <li>Material Characteristics</li> <li>Fastening and Finishing Systems</li> <li>Health and Safety</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>describe the properties of common production materials</li> <li>research and state the reasons for using combinations of wood, metal, plastic, ceramic and other materials</li> <li>identify the methods by which different materials are fastened together</li> <li>identify the types of finishes that are compatible with wood, metal, plastic, ceramic and other surfaces</li> <li>identify health and safety concerns associated with a given material.</li> </ul>	<p>Base reasons on:</p> <ul style="list-style-type: none"> <li>appearance</li> <li>serviceability</li> <li>ease of construction</li> <li>strength</li> <li>cost</li> <li>etc.</li> </ul> <p>Consider mechanical means as well as bonding agents.</p> <p>Refer to WHMIS Material Safety data sheets for appropriate handling use and storage of materials.</p>



## MODULE CON2120: MULTIPLE MATERIALS (continued)

Concept	Specific Learner Expectations	Notes
<b>Planning and Management</b> <ul style="list-style-type: none"> <li>• Product Design</li> <li>• Work Scheduling</li> </ul>	<i>The student should:</i> <ul style="list-style-type: none"> <li>• select, modify or design a product that incorporates two or more materials in its construction</li> <li>• select compatible finishes</li> <li>• create a cutting list and cost estimate</li> <li>• prepare a detailed sequence of operations that facilitates the safe and efficient use of materials and tools.</li> </ul>	
<b>Implementation</b> <ul style="list-style-type: none"> <li>• Material Processing</li> <li>• Finishing</li> </ul>	<ul style="list-style-type: none"> <li>• use the appropriate tools and supplies to safely: <ul style="list-style-type: none"> <li>– measure and lay out components</li> <li>– cut and remove waste from materials</li> <li>– form components where required</li> <li>– fasten or bond components</li> <li>– align and clamp components</li> <li>– prepare for finishing</li> </ul> </li> <li>• finish the product using appropriate finishes.</li> </ul>	
<b>Assessment</b> <ul style="list-style-type: none"> <li>• Quality Control</li> <li>• Career Preparation</li> </ul>	<ul style="list-style-type: none"> <li>• identify indicators of a quality product</li> <li>• maintain a record of completed activities within a portfolio.</li> </ul>	<p>Discuss issues related to appearance, serviceability, workmanship and cost-effectiveness.</p>



## MODULE CON2130: FURNITURE MAKING 1 (BOX CONSTRUCTION)

**Level:** Intermediate

**Theme:** Manufacturing Systems (Processes and Applications)

**Prerequisite:** CON1120 Project Management

**Module Description:** Students develop basic joinery skills and knowledge related to case construction, by producing a box-type piece of furniture.

**Module Parameters:** Access to a woodworking or materials facility and to instruction from an individual with formal, specialized training in cabinetry/carpentry.

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"><li>identify and describe the design features and processes used to construct a box-type furniture product</li><li>apply basic furniture-making skills to plan and construct a piece of furniture based on box construction techniques</li></ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"><li>analysis of an existing piece of furniture or drawing to correctly determine the:<ul style="list-style-type: none"><li>materials used in surface and structural components</li><li>joints and fasteners</li><li>type of finish</li><li>potential weaknesses and points of wear</li></ul></li></ul>	15
	<ul style="list-style-type: none"><li>appropriate design/selection or modification of a box-type product that includes a set of working drawings, parts list, costs estimate, sequence of operations and work schedule</li></ul>	20
	<ul style="list-style-type: none"><li>construction of a box-type furniture components or product.</li></ul> <p><i>Assessment Tool</i> <i>Project Assessment: Box Construction, CON2130-1</i></p> <p><i>Standard</i> <i>The product will be built using the appropriate materials, joinery and finishing techniques; joints are to be tight fitting, flush and square; finishes are to be smooth and free from production defects. Overall dimensions should be within <math>\pm 2</math> mm</i> <i>Performance rating of 2 for each applicable task</i></p>	65



# **MODULE CON2130: FURNITURE MAKING 1 (BOX CONSTRUCTION) (continued)**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p>Orientation</p> <ul style="list-style-type: none"> <li>Box Construction</li> <li>Tool Safety</li> <li>Fittings</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>research typical design and joinery techniques that are commonly used in box construction</li> <li>identify additional construction features such as: <ul style="list-style-type: none"> <li>door</li> <li>drawer</li> <li>plinth</li> </ul> </li> <li>describe the safe set-up and operation of hand and/or power tools to make a series of joints; e.g.: <ul style="list-style-type: none"> <li>reinforced butt</li> <li>reinforced miter</li> <li>rabbet</li> <li>dado</li> <li>finger</li> </ul> </li> <li>identify and describe the use of common fasteners and clamping procedures used with a specific joint</li> <li>identify common fittings and construction techniques used to make: <ul style="list-style-type: none"> <li>flush</li> <li>sliding</li> <li>tambour</li> <li>fall flap doors.</li> </ul> </li> </ul>	<p>This module can be combined with subsequent modules to accommodate more elaborate features such as doors, drawers and a plinth.</p> <p>Review the safe use of the appropriate tools to make a specific joint, such as dado head, router, biscuit joiner.</p> <p>Identify recommended adhesives in relation to intended use and type of joint.</p>



# **MODULE CON2130: FURNITURE MAKING 1 (BOX CONSTRUCTION) (continued)**

Concept	Specific Learner Expectations	Notes
<b>Planning and Management</b> <ul style="list-style-type: none"> <li>• Product Design</li> <li>• Estimating</li> <li>• Work Scheduling</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• select a box-type product that requires the use of: <ul style="list-style-type: none"> <li>– solid wood and/or composites</li> <li>– a variety of joints and fasteners</li> <li>– typical lay-up and clamping procedures</li> </ul> </li> <li>• prepare a material list and cost estimate from a working drawing</li> <li>• prepare a work schedule.</li> </ul>	<p>Suggest products such as:</p> <ul style="list-style-type: none"> <li>• jewelry box</li> <li>• shelving unit</li> <li>• hope chest</li> <li>• speaker enclosure.</li> </ul>
<b>Implementation</b> <ul style="list-style-type: none"> <li>• Material Processing</li> </ul>	<ul style="list-style-type: none"> <li>• use the appropriate tools, materials and processes to: <ul style="list-style-type: none"> <li>– measure and lay out stock</li> <li>– cut stock to size</li> <li>– machine surfaces and joints</li> <li>– lay-up, glue, fasten and clamp</li> <li>– fill or plug exposed fasteners</li> <li>– prepare for finishing.</li> </ul> </li> </ul>	<p>This project can be finished in conjunction with CON2150: Finishing &amp; Refinishing.</p>
<b>Assessment</b> <ul style="list-style-type: none"> <li>• Career Information</li> <li>• Career Preparation</li> </ul>	<ul style="list-style-type: none"> <li>• identify the types of skills that are required of custom furniture builders</li> <li>• maintain a record of completed activities within a portfolio.</li> </ul>	<p>Discuss the need to be able to:</p> <ul style="list-style-type: none"> <li>• read drawings</li> <li>• calculate and measure accurately</li> <li>• use effective planning and problem-solving strategies</li> <li>• use equipment and materials safely.</li> </ul>



## MODULE CON2140: FURNITURE MAKING 2 (FRAME & PANEL)

**Level:** Intermediate

**Theme:** Manufacturing Systems (Processes and Applications)

**Prerequisite:** CON1120 Project Management

**Module Description:** Students use solid and/or composite materials to build a frame and panel product or component.

**Module Parameters:** Access to a woodworking or materials facility and to instruction from an individual with formal specialized training in cabinetry/carpentry.

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"><li>identify and describe the design features and processes used to construct a frame and panel product</li><li>apply basic furniture-making skills to plan and construct a component or piece of furniture based on frame and panel construction techniques</li></ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"><li>analysis of an existing piece of furniture or drawing to correctly determining the:<ul style="list-style-type: none"><li>materials used in surface and structural components</li><li>joints and fasteners</li><li>potential weakness and points of wear</li></ul></li></ul>	10
	<ul style="list-style-type: none"><li>appropriate design selection, modification or creation of a frame and panel product or component that includes a set of drawings, parts list, cost estimate, sequence of operations and work schedule</li></ul>	20
	<ul style="list-style-type: none"><li>construction of a frame and panel product or component.</li></ul> <p><i>Assessment Tool</i> <i>Project Assessment: Frame and Panel Construction, CON2140-1</i></p> <p><i>Standard</i> <i>The project will be built using the appropriate materials, joinery and finishing techniques; all joints are to be tight fitting and square; finishes are to be smooth and free from production defects. Overall dimensions should be within <math>\pm 2</math> mm</i> <i>Performance rating of 2 for each applicable task</i></p>	70



## MODULE CON2140: FURNITURE MAKING 2 (FRAME & PANEL) (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p><b>Orientation</b></p> <ul style="list-style-type: none"> <li>Frame and Panel Construction</li> <li>Fastening Systems</li> <li>Tool Safety</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>identify the construction details of a typical frame and panel component</li> <li>identify the typical wood joints that are used in frame and panel construction</li> <li>identify and describe the types of fastening systems that are used in flat frame construction; e.g.: <ul style="list-style-type: none"> <li>reinforcing plates</li> <li>dowelling</li> <li>biscuits</li> <li>splines</li> </ul> </li> <li>describe the safe set-up and operation of hand and/or power tools used to make a series of joints; e.g.: <ul style="list-style-type: none"> <li>mortise and tenon</li> <li>dowel</li> <li>biscuit</li> <li>lap</li> <li>miter</li> <li>loose tenon.</li> </ul> </li> </ul>	<p>Point out the need to accommodate the movement of the panel within the frame.</p>



# **MODULE CON2140: FURNITURE MAKING 2 (FRAME & PANEL) (continued)**

Concept	Specific Learner Expectations	Notes
<b>Planning and Management</b> <ul style="list-style-type: none"> <li>• <b>Product Design</b></li> <li>• <b>Work Scheduling</b></li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• select a frame and panel product or component that requires: <ul style="list-style-type: none"> <li>– interpretation and development of simple working drawings</li> <li>– use of solid woods and/or composites</li> <li>– use of a variety of wood joints, fasteners and other hardware components</li> <li>– typical lay-up and clamping procedures</li> </ul> </li> <li>• show a detailed material list, cost estimate and work schedule.</li> </ul>	
<b>Implementation</b> <ul style="list-style-type: none"> <li>• <b>Material Processing</b></li> </ul>	<ul style="list-style-type: none"> <li>• use the appropriate tools, machines and processes to: <ul style="list-style-type: none"> <li>– measure and lay out stock</li> <li>– cut stock to size</li> <li>– machine and fit joints</li> <li>– lay-up, glue, fasten and/or clamp</li> <li>– fill or plug exposed fasteners (where applicable)</li> <li>– finish the project.</li> </ul> </li> </ul>	<p>This project can be finished in conjunction with CON2150: Finishing &amp; Refinishing.</p>
<b>Assessment</b> <ul style="list-style-type: none"> <li>• <b>Career Preparation</b></li> </ul>	<ul style="list-style-type: none"> <li>• maintain a record of completed activities within a portfolio.</li> </ul>	



## MODULE CON2150: FINISHING & REFINISHING

**Level:** Intermediate

**Theme:** Manufacturing Systems (Processes and Applications)

**Prerequisite:** CON1010 Basic Tools & Materials

**Module Description:** Students use knowledge of finishing materials and finishing techniques to apply new and replacement finishes.

**Module Parameters:** Access to a woodworking or materials facility and to instruction from an individual with specialized training in finishing/refinishing.

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"><li>identify common finishes and finishing/refinishing techniques</li><li>identify and describe the health hazards and Workplace Hazardous Materials Information System (WHMIS) regulations associated with the products used in finishing/refinishing</li><li>demonstrate appropriate finishing/refinishing techniques</li></ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"><li>a written or oral response that identifies common finishes and application techniques, health hazards associated with the handling and storage of finishing materials. <i>Assessment Tool</i> <i>Response Assessment: Common Finishes and Finishing Techniques, CON2150-1</i> <i>Standard</i> <i>Response rating of 2</i></li><li>application of finishing skills to finish/refinish a piece of furniture <i>Assessment Tool</i> <i>Activity Assessment: Product Finishing, CON2150-2</i> <i>Standard</i> <i>Finish should be applied according to the manufacturer's recommendations. Finished surfaces are consistent smooth, free of runs and dust particles</i> <i>Performance rating of 2 for each applicable task</i></li></ul>	20  10       70



## MODULE CON2150: FINISHING & REFINISHING (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p>Orientation</p> <ul style="list-style-type: none"> <li>Refinishing</li> <li>Conditioning</li> <li>Finishes</li> <li>Sealers and Fillers</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>describe techniques that are used to: <ul style="list-style-type: none"> <li>identify an existing finish</li> <li>remove a stain or finish</li> <li>prepare a surface for refinishing</li> </ul> </li> <li>explain: <ul style="list-style-type: none"> <li>bleaching and staining</li> <li>filling and sealing</li> <li>creating a distressed finish</li> </ul> </li> <li>identify common finishes and applications</li> <li>explain the purpose of a filler and sealer</li> <li>identify the preferred method of applying each of the above finishes such as brush, roller, rag, spray gun</li> <li>describe what thinners and cleaners are used in conjunction with a given finish</li> </ul>	<p>Avoid working with finishes that contain lead.</p> <p>Discuss the use of:</p> <ul style="list-style-type: none"> <li>oil</li> <li>shellac</li> <li>varnish</li> <li>lacquer</li> <li>urethane</li> <li>epoxy</li> <li>finishes.</li> </ul> <p>Explain why it is important to use the appropriate finish remover and thinner.</p>



## MODULE CON2150: FINISHING & REFINISHING (continued)

Concept	Specific Learner Expectations	Notes
<ul style="list-style-type: none"> <li>Health and Safety</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>describe the manufacturers' recommendations and WHMIS regulations that apply to the use and storage of a given product.</li> </ul>	Students need to understand the purpose and use of product labels and material safety data sheets.
Planning and Management	<ul style="list-style-type: none"> <li>for a refinishing project:               <ul style="list-style-type: none"> <li>identify the nature of the existing finish and finish removers</li> <li>identify appropriate personal protective equipment</li> </ul> </li> <li>for new and old surfaces:               <ul style="list-style-type: none"> <li>select a suitable new or replacement finish</li> <li>prepare a detailed set of step-by-step finishing procedures</li> <li>clean the product and the work site.</li> </ul> </li> </ul>	Review the appropriate procedures for disposing of waste materials.
<p>Implementation</p> <ul style="list-style-type: none"> <li>Finishing Processes</li> <li>Safety</li> </ul>	<ul style="list-style-type: none"> <li>use the appropriate tools, materials and techniques to:               <ul style="list-style-type: none"> <li>remove an existing finish</li> <li>stain and seal</li> <li>apply the necessary top coats</li> <li>sand, rub and polish as required</li> </ul> </li> <li>discard all rags and used materials in the appropriate containers.</li> </ul>	Point out the importance of working in a clean and well-ventilated work area.
<p>Assessment</p> <ul style="list-style-type: none"> <li>Quality Control</li> <li>Career Preparation</li> </ul>	<ul style="list-style-type: none"> <li>identify ways to improve the quality of a finish</li> <li>maintain a record of completed activities within a portfolio.</li> </ul>	



## MODULE CON2160: CABINETMAKING 1 (WEB & FACE FRAME)

**Level:** Intermediate

**Theme:** Manufacturing Systems (Processes and Applications)

**Prerequisite:** CON1120 Project Management

**Module Description:** Students apply web and face frame construction techniques, and use solid and/or manufactured materials to produce a built-in or modular cabinet.

**Module Parameters:** Access to a woodworking or materials facility and to instruction from an individual with specialized training in cabinetry/carpentry.

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"><li>identify and describe the design features and processes used to construct a web and face frame product</li><li>prepare a detailed material list and event sequence</li></ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"><li>analysis of a typical web and face frame product or drawing that correctly identifies and describes the types of:<ul style="list-style-type: none"><li>materials and finishes</li><li>joints and methods of fastening to a box structure</li><li>potential weaknesses and points of wear</li></ul></li></ul> <p style="text-align: center;"><i>and</i></p> <ul style="list-style-type: none"><li>demonstration of appropriate estimating and event scheduling skills.</li></ul> <p><i>Assessment Tool</i> <i>Project Assessment: Web and Face Frame Construction, CON2160-1</i></p> <p><i>Standard</i> <i>Materials list is accurately determined using a working drawing, events are identified and scheduled in a safe and logical sequence of operations</i> <i>Performance rating of 2 for each applicable task</i></p>	<p>10</p> <p>15</p>



# **MODULE CON2160: CABINETMAKING 1 (WEB & FACE FRAME) (continued)**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>build a cabinet using web and face frame construction techniques</li> <li>demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>application of web and face frame construction skills and techniques.</li> </ul> <p><i>Assessment Tool</i>  <i>Project Assessment: Web and Face Frame Construction, CON2160-1</i></p> <p><i>Standard</i>  <i>The project should be built using the appropriate materials, joinery and finishing techniques. All joints are to be tight fitting, flush and square; finishes are to be smooth and free from production defects. Overall dimensions are within <math>\pm 2</math> mm</i></p> <p><i>Performance rating of 2 for each applicable task</i></p> <ul style="list-style-type: none"> <li>observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>75</p> <p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p>Orientation</p> <ul style="list-style-type: none"> <li>Construction Methods</li> <li>Tool Safety</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>describe the principal methods used to construct a built-in cabinet; e.g.: <ul style="list-style-type: none"> <li>on-site construction</li> <li>modular system</li> </ul> </li> <li>identify the parts of a web frame cabinet</li> <li>describe the types of joints used in web and face frame construction</li> <li>describe safe set-up procedures to make common joints associated with web and face frame construction</li> <li>identify the appropriate fastening systems used in economy and premium grade construction.</li> </ul>	<p>For more elaborate projects, this module can be combined with other cabinetry modules.</p> <p>Review the use of a table/radial arm saw and compound miter saw.</p> <p>Discuss procedures used to make dowel, biscuit and pocket holes.</p>



**MODULE CON2160: CABINETMAKING 1 (WEB & FACE FRAME) (continued)**

Concept	Specific Learner Expectations	Notes
<b>Planning and Management</b> <ul style="list-style-type: none"><li>• Design</li><li>• Work Scheduling</li></ul>	<i>The student should:</i> <ul style="list-style-type: none"><li>• select or modify a cabinet drawing that uses web and face frame construction</li><li>• create a work schedule</li><li>• prepare a material cutting list.</li></ul>	
<b>Implementation</b> <ul style="list-style-type: none"><li>• Material Processing</li></ul>	<ul style="list-style-type: none"><li>• use the appropriate tools, materials and processes to:<ul style="list-style-type: none"><li>– measure and lay out materials</li><li>– rough-out materials</li><li>– machine joints and surfaces</li><li>– assemble, glue, fasten and clamp</li><li>– fill, scrape and sand.</li></ul></li></ul>	
<b>Assessment</b> <ul style="list-style-type: none"><li>• Career Information</li><li>• Career Preparation</li></ul>	<ul style="list-style-type: none"><li>• analyze and compare the differences between a production cabinetmaker and custom cabinetmaker</li><li>• maintain a record of completed activities within a portfolio.</li></ul>	



MODULE CON2170: CABINETMAKING 2 (DOOR & DRAWER)	
<b>Level:</b>	Intermediate
<b>Theme:</b>	Manufacturing Systems (Processes and Applications)
<b>Prerequisite:</b>	CON1120 Project Management
<b>Module Description:</b>	Students use solid and composite materials to develop skills in building cabinet doors and drawers.

**Theme:** Manufacturing Systems (Processes and Applications)

**Module Description:** Students use solid and composite materials to develop skills in building cabinet doors and drawers.

**Module Parameters:** Access to a woodworking or materials facility and to instruction from an individual with formal, specialized training in cabinetry/ carpentry.

## Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>identify and describe common methods of designing and constructing cabinet doors and drawers</li> <li>apply cabinetmaking skills to plan and construct door/drawer components</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>analysis of existing door and drawer products or drawings to determine:               <ul style="list-style-type: none"> <li>the structural materials</li> <li>the parts of a typical door and drawer</li> <li>two or more edge treatments used on a door</li> <li>two or more types of joints used in a drawer construction</li> <li>two or more types of hinge and slide hardware</li> </ul> </li> <li>the construction of a door and drawer product or component.</li> </ul> <p><i>Assessment Tool</i>  <i>Project Assessment: Door and Drawer Construction, CON2170-1</i></p> <p><i>Standard</i>  <i>The project should be built using the appropriate materials, joinery and finishing techniques; all joints are to be tight fitting and square; finishes are to be smooth and free from production defects. Overall dimensions should be within <math>\pm 2</math> mm</i>  <i>Performance rating of 2 for each applicable task</i></p>	<p>15</p> <p>75</p>



# **MODULE CON2170: CABINET MAKING 2 (DOOR & DRAWER) (continued)**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>profile a trade or occupation within the cabinetmaking field</li> <li>demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>presentation of an occupation profile that outlines: <ul style="list-style-type: none"> <li>– type of work and working conditions</li> <li>– present and future employment opportunities</li> <li>– training and entry requirements.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Research Process: Career Opportunities in the Cabinetry Trade, CON2170–2</i></p> <p><i>Standard</i>  <i>Performance rating of 2 for each applicable task</i></p> <ul style="list-style-type: none"> <li>observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>10</p> <p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p>Orientation</p> <ul style="list-style-type: none"> <li>Door and Drawer Construction</li> <li>Tool Safety</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>research methods of producing various door treatments such as raised panel, flush and glass inset</li> <li>research common door and drawer construction techniques and hardware options</li> <li>identify the common joints used in door and drawer construction</li> <li>identify the equipment and describe safe set-up procedures to make a given drawer and door component.</li> </ul>	<p>Compare the design features of various drawer guide systems.</p> <p>Demonstrate methods to make a typical:</p> <ul style="list-style-type: none"> <li>– stile and rail</li> <li>– raised panel</li> <li>– inlay door component.</li> </ul>



# **MODULE CON2170: CABINET MAKING 2 (DOOR & DRAWER) (continued)**

Concept	Specific Learner Expectations	Notes
<b>Planning and Management</b> <ul style="list-style-type: none"> <li>• Design</li> <li>• Work Scheduling</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• select or modify a cabinet drawing of a drawer and built-up door</li> <li>• select the appropriate door and dresser material</li> <li>• identify an appropriate door guiding system</li> <li>• create a material and procedural list.</li> </ul>	<p>Discuss the different quality levels of door and drawer construction and hardware.</p>
<b>Implementation</b> <ul style="list-style-type: none"> <li>• Material Processing</li> </ul>	<ul style="list-style-type: none"> <li>• use the appropriate tools, materials and processes to: <ul style="list-style-type: none"> <li>– measure and lay out materials</li> <li>– machine surfaces and joints</li> <li>– assemble, glue, fasten and clamp</li> <li>– prepare for finishing.</li> </ul> </li> </ul>	<p>Finishing may be completed in CON2150: Finishing &amp; Refinishing.</p>
<b>Assessment</b> <ul style="list-style-type: none"> <li>• Career Information</li> <li>• Career Preparation</li> </ul>	<ul style="list-style-type: none"> <li>• identify specific employment and further training opportunities related to custom and factory-made cabinets</li> <li>• maintain a profile of completed activities within a portfolio.</li> </ul>	



## MODULE CON2180: WOOD FORMING

**Level:** Intermediate

**Theme:** Manufacturing Systems (Processes and Applications)

**Prerequisite:** CON1120 Project Management

**Module Description:** Students apply skills in mold making and wood conditioning to make a formed part or component.

**Module Parameters:** Access to a woodworking or materials facility and to instruction from an individual with specialized training in woodworking.

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"><li>describe common wood forming techniques</li></ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"><li>a written or oral response that correctly identifies describes three wood forming techniques. <i>Assessment Tool</i> <i>Response Assessment, Bending and Laminating, CON2180-1</i> <i>Standard</i> <i>Response rating of 2</i></li></ul>	10
<ul style="list-style-type: none"><li>build or obtain the necessary molds and clamping devices to bend a piece of solid stock or wood laminate</li></ul>	<ul style="list-style-type: none"><li>construction/set-up of tools required to bend a piece of solid or laminated stock. <i>Assessment Tool</i> <i>Product Assessment: Wood Formed Products, CON2180-2</i> <i>Standard</i> <i>Molds allow for even application of pressure and protect surface from unnecessary blemishes</i> <i>Performance rating of 2 for each applicable task</i></li></ul>	20
<ul style="list-style-type: none"><li>apply wood forming skills and techniques to make a product or component</li></ul>	<ul style="list-style-type: none"><li>application of wood forming techniques and skills to create a product with one or more formed components. <i>Assessment Tool</i> <i>Project Assessment: Wood Formed Products, CON2180-2</i> <i>Standard</i> <i>The appropriate materials are selected and bent accurately so as to provide a tight fit to all adjoining components. An individual product is accurate to the original design</i> <i>Performance rating of 2 for each applicable task</i></li></ul>	70

Intermediate

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## MODULE CON2180: WOOD FORMING (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p><b>Orientation</b></p> <ul style="list-style-type: none"> <li>Forming Techniques</li> <li>Forming Materials</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>research and describe typical methods of bending solid stock and laminates; such as soaking in water, steaming or chemical conditioning</li> <li>describe how to determine the correct spacing for cross and parallel kerfing</li> <li>describe a system to moisten or steam wood (plasticize) prior to bending</li> <li>identify woods that lend themselves to cold water or steam bending</li> <li>identify methods of building up – molding and clamping veneer stock</li> <li>select the most appropriate adhesive for a given application and process.</li> </ul>	<p>Discuss the inherent dangers associated with the use of steam.</p>
<p><b>Planning and Management</b></p> <ul style="list-style-type: none"> <li>Design</li> <li>Material</li> </ul>	<ul style="list-style-type: none"> <li>select or design a formed product or component</li> <li>calculate the spacing of kerfs for a given radius bend</li> <li>design a mold for bending or contouring solid stock</li> <li>obtain suitable stock for bending.</li> </ul>	<p>Products might include:</p> <ul style="list-style-type: none"> <li>furniture components</li> <li>recreational equipment</li> <li>marine structures.</li> </ul>



## MODULE CON2180: WOOD FORMING (continued)

Concept	Specific Learner Expectations	Notes
Implementation <ul style="list-style-type: none"><li>Material Processing</li></ul>	<i>The student should:</i> <ul style="list-style-type: none"><li>use the appropriate tools, materials and processes to:<ul style="list-style-type: none"><li>prepare solid and/or veneer stock for bending</li><li>condition, glue and secure</li><li>release and finish.</li></ul></li></ul>	Discuss the importance of using stock that is free from knots and cross-grained sections.
Assessment <ul style="list-style-type: none"><li>Career Preparation</li></ul>	<ul style="list-style-type: none"><li>maintain a record of completed activities within a portfolio.</li></ul>	



## MODULE CON2190: MANUFACTURING SYSTEMS

**Level:** Intermediate

**Theme:** Manufacturing Systems (Processes and Applications)

**Prerequisite:** None

**Module Description:** Students investigate the nature of manufacturing systems used to produce durable goods.

**Module Parameters:** Access to in-school and community resources related to manufacturing.

**Supporting Module:** CON1010 Basic Tools & Materials

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"><li>describe current production systems used to manufacture durable goods</li><li>identify the lines of communication and decision making in a typical production system</li><li>explain how the production of durable goods is being altered by the effects of technology and the global economy</li><li>demonstrate basic competencies.</li></ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"><li>the analysis of two systems of production currently in use and the presentation of a report that emphasizes the:<ul style="list-style-type: none"><li>advantages and disadvantages of each system</li><li>lines of communication and decision making processes typical to each system</li><li>how these systems are being altered to meet the needs of and competition in a global economy.</li></ul></li></ul> <p><i>Assessment Tool</i> <i>Assessment Framework: Presentations/Reports, CONPRE</i></p> <p><i>Standard</i> <i>Performance rating of 2 for each applicable task</i></p> <ul style="list-style-type: none"><li>observations of individual effort and interpersonal interaction during the learning process.</li></ul> <p><i>Assessment Tool</i> <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>100</p> <p>Integrated throughout</p>



## MODULE CON2190: MANUFACTURING SYSTEMS (continued)

Concept	Specific Learner Expectations	Notes
<p>Orientation</p> <ul style="list-style-type: none"> <li>History of Manufacturing</li> <li>Economic Advantages</li> <li>Organization</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>describe the development of modern manufacturing from its early routes in the domestic, cottage and factory systems</li> <li>explain the advantages and disadvantages of a strong manufacturing base in a community</li> <li>describe the operations of a typical manufacturing system's input requirements, types of processes and outputs as well as its feedback mechanisms</li> <li>show how a typical manufacturer is able to: <ul style="list-style-type: none"> <li>increase productivity</li> <li>provide for choice</li> <li>reduce skill level requirements</li> <li>reduce costs per unit produced</li> </ul> </li> <li>describe how computer-assisted manufacturing, just-in-time and total quality management systems increase: <ul style="list-style-type: none"> <li>productivity</li> <li>quality</li> <li>profitability</li> </ul> </li> <li>research a manufacturing company and describe its: <ul style="list-style-type: none"> <li>organizational structure</li> <li>methods of decision making</li> <li>methods of financing</li> <li>training practices</li> <li>research and development</li> <li>marketing practices</li> </ul> </li> <li>explain why manufacturers are interested in locating near: <ul style="list-style-type: none"> <li>skilled population bases</li> <li>resources</li> <li>markets</li> </ul> </li> </ul>	<p>This module is investigative in nature. Students should be encouraged to visit local manufacturers to obtain much of their information base.</p> <p>If possible, have students arrange an interview with a local manufacturer.</p>



## MODULE CON2190: MANUFACTURING SYSTEMS (continued)

Concept	Specific Learner Expectations	Notes
<ul style="list-style-type: none"><li>Global Impact</li></ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"><li>describe the place organized labour has in manufacturing</li><li>explain how manufacturing is being altered by our global economy and the use of technology.</li></ul>	



## MODULE CON2200: PRODUCT DEVELOPMENT

**Level:** Intermediate

**Theme:** Manufacturing Systems (Processes and Applications)

**Prerequisite:** CON1010 Basic Tools & Materials

**Module Description:** Students work, individually or as team members, to research, design and build a product suitable for mass production and marketing.

**Module Parameters:** Access to a materials/construction facility and to instruction from an individual with specialized training in the use of tools and materials.

**Supporting Module:** CON2190 Manufacturing Systems

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"><li>list and describe the steps involved in developing a product for manufacturing</li></ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"><li>presentation of a group or individually prepared report that list and describes the steps in developing a product for manufacturing, such as:<ul style="list-style-type: none"><li>defining the problem</li><li>research possible solutions</li><li>creating solutions</li><li>determining marketability</li><li>determining profit margin</li></ul></li></ul>	20
<ul style="list-style-type: none"><li>apply designing and planning skills to assist in the development of a prototype</li></ul>	<ul style="list-style-type: none"><li>demonstrate design and planning skills required in the development of a prototype product.</li></ul> <p><i>Assessment Tool</i> <i>Project Assessment: Building a Prototype, CON2200-1</i></p> <p><i>Standard</i> <i>Performance rating of 2 for each applicable task</i></p>	50
<ul style="list-style-type: none"><li>describe the marketing and manufacturing potential of a product</li></ul>	<ul style="list-style-type: none"><li>evaluation of a product prototype to determine whether it meets the desired design, production and marketing criteria.</li></ul> <p><i>Assessment Tool</i> <i>Illustrative Example, CON2200-2</i></p> <p><i>Standard</i> <i>Performance rating of 2 for each applicable task</i></p>	30



## MODULE CON2200: PRODUCT DEVELOPMENT (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p>Orientation</p> <ul style="list-style-type: none"> <li>Product Life Cycle</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>describe the life cycle of a typical product from the time of introduction to its decline</li> <li>identify reasons for a product being successful; e.g.: <ul style="list-style-type: none"> <li>meet a physical and emotional need</li> <li>marketing practice</li> <li>pricing</li> <li>reputation</li> </ul> </li> </ul>	<p>Note the importance of considering the issues related to product disposal and/or recycling in the initial design stages of a product.</p>
<ul style="list-style-type: none"> <li>Idea Generation</li> </ul>	<ul style="list-style-type: none"> <li>explain how new product ideas are generated</li> <li>outline how ideas are developed into new products</li> <li>identify the major steps involved in engineering a new product</li> </ul>	<p>Students should be encouraged to create a new product, not simply replicate an existing one.</p>
<ul style="list-style-type: none"> <li>Testing</li> </ul>	<ul style="list-style-type: none"> <li>state the importance of product testing and market surveys.</li> </ul>	



## MODULE CON2200: PRODUCT DEVELOPMENT (continued)

Concept	Specific Learner Expectations	Notes
<b>Planning and Management</b> <ul style="list-style-type: none"> <li>• <b>Prototype Development</b></li> </ul>	<i>The student should:</i> <ul style="list-style-type: none"> <li>• select or design a product for manufacturing</li> <li>• create the necessary detail, assembly and schematic drawings</li> <li>• identify the appropriate materials</li> <li>• create a prototype product</li> <li>• analyze the design: <ul style="list-style-type: none"> <li>– function</li> <li>– aesthetic appeal</li> <li>– reliability</li> <li>– manufacturability</li> <li>– profitability</li> </ul> </li> <li>• create a market survey.</li> </ul>	
<b>Implementation</b>	<ul style="list-style-type: none"> <li>• create a prototype product</li> <li>• test the product</li> <li>• prepare a market survey.</li> </ul>	
<b>Assessment</b> <ul style="list-style-type: none"> <li>• <b>Career Assessment</b></li> <li>• <b>Career Preparation</b></li> </ul>	<ul style="list-style-type: none"> <li>• identify career opportunities related to product marketing and research</li> <li>• maintain a record of completed activities within a portfolio.</li> </ul>	



# MODULE CURRICULUM AND ASSESSMENT STANDARDS:

## SECTION F: ADVANCED LEVEL

The following pages define the curriculum and assessment standards for the advanced level of Construction Technologies.

Advanced level modules demand a higher level of expertise and help prepare students for entry into the workplace or a related post-secondary program.

Module CON3010:	Concrete Work (Structures & Finishes) .....	F.3
Module CON3020:	Masonry Work (Structures & Finishes) .....	F.7
Module CON3030:	Wall & Ceiling Finishing .....	F.11
Module CON3040:	Stair Construction .....	F.15
Module CON3050:	Roof Structures 2 (Framing & Covering) .....	F.19
Module CON3060:	Doors & Trim .....	F.23
Module CON3070:	Floorcovering .....	F.27
Module CON3080:	Energy-efficient Housing .....	F.31
Module CON3090:	Renovations/Restorations .....	F.35
Module CON3100:	Commercial Structures .....	F.39
Module CON3110:	Site Management .....	F.43
Module CON3120:	Tool Maintenance .....	F.47
Module CON3130:	Furniture Making 3 (Leg & Rail) .....	F.51
Module CON3140:	Furniture Making 4 (Surface Enhancement) .....	F.55
Module CON3150:	Furniture Repair .....	F.59
Module CON3160:	Cabinetmaking 3 (Cabinets/Countertops) .....	F.63
Module CON3170:	Cabinetmaking 4 (Layout & Installation) .....	F.67
Module CON3190:	Production Planning .....	F.71
Module CON3200:	Production Management .....	F.75
Module CON3210:	Framing Systems 2 (Floor, Wall & Ceiling) .....	F.79



**MODULE CON3010: CONCRETE WORK (STRUCTURES & FINISHES)****Level:** Advanced**Theme:** Building Systems (Processes and Applications)**Prerequisite:** CON1070 Building Construction**Module Description:** Students develop essential skills to form, place and finish a concrete project.**Module Parameters:** Access to a building site and/or construction facility and to instruction from an individual with specialized training in concrete work.**Supporting Modules:** CON2010 Site Preparation  
CON2020 Concrete Forming**Curriculum and Assessment Standards**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>identify and describe concrete forming, placing and finishing techniques</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>a written report or display that accurately represents accepted forming, placing and finishing trade practices.</li> </ul> <p><i>Assessment Tool</i> <i>Research Process: Concrete Forming, Placing and Finishing, CON3010-1</i></p> <p><i>Standard</i> <i>Performance rating of 3 for each applicable task</i></p>	20
<ul style="list-style-type: none"> <li>use the appropriate tools, materials and processes to form, reinforce, place and finish a concrete structure</li> </ul>	<ul style="list-style-type: none"> <li>demonstration of concrete forming, placing and finishing techniques.</li> </ul> <p><i>Assessment Tool</i> <i>Assessment Framework: Activity Assessment, CONACT</i></p> <p><i>Standard</i> <i>The project should be free of voids and finished in a manner appropriate to its application</i> <i>Performance rating of 3 for each applicable task</i></p>	65
<ul style="list-style-type: none"> <li>create a profile of a trade or occupation within the field of concrete work</li> </ul>	<ul style="list-style-type: none"> <li>presentation of an occupational profile that includes a description of working conditions, employment and training opportunities related to concrete work.</li> </ul> <p><i>Assessment Tool</i> <i>Research Process: Concrete Forming, Placing and Finishing, CON3010-1</i></p> <p><i>Standard</i> <i>Performance rating of 3 for each applicable task</i></p>	15



# **MODULE CON3010: CONCRETE WORK (STRUCTURES & FINISHES) (continued)**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p><b>Orientation</b></p> <ul style="list-style-type: none"> <li>Concrete Mixing and Testing</li> <li>Forming</li> <li>Placement and Finishing</li> <li>Fasteners</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>research the effect aggregate, water and cement ratios have on the workability and quality of a concrete mix</li> <li>list and describe the purpose of different cement types</li> <li>identify the types of tests and reasons for concrete testing</li> <li>describe standard forming and reinforcing practices for a project; e.g.: <ul style="list-style-type: none"> <li>slab on grade</li> <li>retaining wall</li> <li>poured stairs</li> </ul> </li> <li>explain the purpose of a control and expansion joint in a concrete structure</li> <li>identify the purpose and describe the process of: <ul style="list-style-type: none"> <li>screeding</li> <li>puddling</li> <li>striking off</li> <li>floating</li> <li>troweling</li> <li>finishing</li> <li>curing</li> </ul> </li> <li>describe common methods of installing fasteners in concrete before and after the concrete has set up and cured</li> </ul>	<p>Emphasize the importance of using clean aggregate and water.</p> <p>Demonstrate the slump test and describe compression testing.</p> <p>Explain why rebar should be free of loose rust, scale grease and other foreign matter.</p> <p>Identify required protection of rebar exposed to the weather or ground.</p>



# MODULE CON3010: CONCRETE WORK (STRUCTURES & FINISHES) (continued)

Concept	Specific Learner Expectations	Notes
<ul style="list-style-type: none"> <li>Tool Safety</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>describe the safe use and storage of explosive actuated tools and supplies</li> <li>identify power loads and strengths for a given application</li> <li>describe prefiring and firing routines.</li> </ul>	<p>Students need to recognize the training requirements and the hazards associated with explosive actuated tools.</p>
<p>Planning and Management</p> <ul style="list-style-type: none"> <li>Material and Work Scheduling</li> </ul>	<ul style="list-style-type: none"> <li>select a concrete project that requires: <ul style="list-style-type: none"> <li>forming</li> <li>reinforcement</li> <li>consolidation and finishing</li> </ul> </li> <li>produce a list of materials and schedule of events for an on-site project.</li> </ul>	<p>A typical shop project may include sidewalk blocks, truck weights, sundial or birdbath.</p> <p>On-site projects could include slab on grade, steps or retaining wall.</p>
<p>Implementation</p> <ul style="list-style-type: none"> <li>Material Processing</li> </ul>	<ul style="list-style-type: none"> <li>use the appropriate tools, materials and processes to: <ul style="list-style-type: none"> <li>prepare the grade and base</li> <li>assemble/build and condition a form</li> <li>install damp-proof member</li> <li>fabricate and install the required reinforcement</li> <li>mix/order, place and consolidate</li> <li>impart desired finish/colour</li> <li>provide proper curing conditions</li> <li>remove forms.</li> </ul> </li> </ul>	<p>Discuss the type of finishes and colours that can be obtained on a concrete surface.</p>
<p>Assessment</p> <ul style="list-style-type: none"> <li>Career Information</li> <li>Career Preparation</li> </ul>	<ul style="list-style-type: none"> <li>identify the employment and training opportunities related to: <ul style="list-style-type: none"> <li>product distribution</li> <li>concrete testing</li> <li>engineering</li> <li>concrete placing and finishing</li> </ul> </li> <li>assess personal interests and abilities related to making realistic career choices</li> <li>maintain a record of completed work within a portfolio.</li> </ul>	<p>Students need to be aware that because concrete is used extensively in residential, commercial and civil construction, it provides a large number of career opportunities.</p>



## MODULE CON3020: MASONRY WORK (STRUCTURES & FINISHES)

**Level:** Advanced

**Theme:** Building Systems (Processes and Applications)

**Prerequisite:** CON1070 Building Construction

**Module Description:** Students develop basic knowledge and skills related to masonry materials, structures and finishes.

**Module Parameters:** Access to a building site and/or construction facility and to instruction from an individual with specialized training in masonry work.

**Supporting Module:** CON3010 Concrete Work (Structures & Finishes)

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"><li>identify and describe common types of masonry materials and finishes</li></ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"><li>written response that correctly identifies and describes three different masonry materials and finishes.</li></ul> <i>Assessment Tool</i> <i>Research Process: Masonry Materials and Finishes, CON3020-1</i> <i>Standard</i> <i>Performance rating of 3 for each applicable task</i>	10
<ul style="list-style-type: none"><li>read and interpret a working drawing to prepare a cost estimate of a masonry surface</li></ul>	<ul style="list-style-type: none"><li>preparation of a cost estimate that includes cost of materials and labour</li></ul>	15
<ul style="list-style-type: none"><li>apply masonry skills to assist in the application of a masonry finish or in the construction of a masonry structure</li></ul>	<ul style="list-style-type: none"><li>demonstration of acceptable works skills in relation to the application of a masonry finishes or construction of a masonry structure.</li></ul> <i>Assessment Tool</i> <i>Assessment Framework: Activity Assessment, CONACT</i> <i>Standard</i> <i>Finishes are applied and structure built in keeping with accepted trade practice</i> <i>Performance rating of 3 for each applicable task</i>	65



# **MODULE CON3020: MASONRY WORK (STRUCTURES & FINISHES) (continued)**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>create a profile of a trade or occupation within the field of masonry work</li> <li>demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>presentation of an occupational profile that includes: <ul style="list-style-type: none"> <li>working conditions</li> <li>employment opportunities</li> <li>training and entry requirements</li> <li>describe opportunities for career advancement and self employment.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Research Process: Masonry Materials and Finishes, CON3020-1</i></p> <p><i>Standard</i>  <i>Performance rating of 2 for each applicable task</i></p> <ul style="list-style-type: none"> <li>observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>10</p> <p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p>Orientation</p> <ul style="list-style-type: none"> <li>Brick Veneering</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>explain reasons for using a masonry finish over other types of finishes</li> <li>analyze a brick veneer wall section and determine the method that is used to: <ul style="list-style-type: none"> <li>support the weight of the brick</li> <li>attach the bricks to the wall surface</li> <li>prevent moisture build-up between the wall surfaces</li> </ul> </li> <li>describe the different sizes, textures and grades of bricks</li> <li>identify common types of patterns and bonds used in brick structures and veneering</li> </ul>	<p>Discuss factors such as:</p> <ul style="list-style-type: none"> <li>appearance</li> <li>durability</li> <li>lower upkeep</li> <li>lower risk of fire.</li> </ul>



## MODULE CON3020: MASONRY WORK (STRUCTURES & FINISHES) (continued)

Concept	Specific Learner Expectations	Notes
<ul style="list-style-type: none"> <li>Brick Veneering (continued)</li> <li>Stuccoing</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>list and describe the basic tools that are used in laying brick and concrete blocks</li> <li>describe the techniques that are used to: <ul style="list-style-type: none"> <li>cut brick</li> <li>keep courses level and plumb</li> <li>build a lead</li> <li>tool joints</li> </ul> </li> <li>examine a stucco wall section and identify the: <ul style="list-style-type: none"> <li>moisture barrier</li> <li>corner and stop beads</li> <li>lath or wire</li> <li>scratch coat</li> <li>screeds</li> <li>finish coat</li> </ul> </li> <li>identify common finishes and methods of application such as: <ul style="list-style-type: none"> <li>smooth</li> <li>spatter</li> <li>old English</li> </ul> </li> <li>identify the differences and similarities between applying a stucco finish to a frame wall and applying parging to a cement or block wall</li> <li>describe the steps that are taken to compensate for extreme weather conditions.</li> </ul>	<p>If possible, have students visit a building site to observe how bricks are laid.</p>
<p>Planning and Management</p> <ul style="list-style-type: none"> <li>Mixing Proportions</li> <li>Estimating</li> </ul>	<ul style="list-style-type: none"> <li>describe the proper mixing proportions to prepare a mortar, stucco and parging mix</li> <li>estimate the amount of materials required to brick veneer a wall section, stucco or parge a surface.</li> </ul>	



**MODULE CON3020: MASONRY WORK (STRUCTURES & FINISHES) (continued)**

Concept	Specific Learner Expectations	Notes
<b>Implementation</b> <ul style="list-style-type: none"><li>• Material and Tool Processes</li></ul>	<i>The student should:</i> <ul style="list-style-type: none"><li>• use appropriate materials, tools and techniques to:<ul style="list-style-type: none"><li>– apply a brick veneer finish or build a brick structure</li><li>– stucco or parge a wall surface.</li></ul></li></ul>	Students can gain experience laying brick using a non-permanent mortar.
<b>Assessment</b> <ul style="list-style-type: none"><li>• Career Information</li><li>• Career Preparation</li></ul>	<ul style="list-style-type: none"><li>• identify specialized training and skills required in the masonry trades</li><li>• research the job opportunities, working conditions and wages paid to masonry workers</li><li>• analyze personal interests and abilities related to making realistic career choices</li><li>• maintain a record of completed activities within a portfolio.</li></ul>	



**MODULE CON3030: WALL & CEILING FINISHING****Level:** Advanced**Theme:** Building Systems (Processes and Applications)**Prerequisite:** CON1070 Building Construction**Module Description:** Students develop basic knowledge and skills to insulate, install and finish an interior wall/ceiling surface.**Module Parameters:** Access to a building site and/or construction facility and to instruction from an individual with specialized training in carpentry.**Supporting Module:** CON2040 Framing Systems 1 (Floor & Wall)**Curriculum and Assessment Standards**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>describe the procedures related to the installation of insulation and vapour barrier to an exterior wall and ceiling</li> <li>identify and describe the health hazards and safety precautions associated with the use of insulating, drywalling and finishing materials</li> <li>prepare, apply and finish a wall and ceiling surface</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>a written response that correctly describes the procedures employed in the selection and installation of insulation, vapour barrier and wall/ceiling boards</li> <li>the identification of health and safety issues related to the handling and use of insulation and wallboard materials.</li> </ul> <p><i>Assessment Tool</i>  <i>Response Assessment: Insulating and Drywalling, CON3030-1</i></p> <p><i>Standard</i>  <i>Response rating of 3</i></p> <ul style="list-style-type: none"> <li>demonstration of appropriate skills and techniques in the application of a wall/ceiling treatment given an on-site or mock-up project.</li> </ul> <p><i>Assessment Tool</i>  <i>Activity Assessment: Installing and Finishing Drywall, CON3030-2</i></p> <p><i>Standard</i>  <i>Materials have been selected and installed in keeping with the specifications, accepted trade practice and local code requirements.</i>  <i>Surfaces are finished smooth and free of voids</i>  <i>Performance rating of 3 for each applicable task</i></p>	<p>25</p> <p>75</p>



## MODULE CON3030: WALL & CEILING FINISHING (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p><b>Orientation</b></p> <ul style="list-style-type: none"> <li>Materials</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>list and describe the types of wall and ceiling insulation and soundproofing materials</li> <li>describe the different types of drywall and conditions of use</li> <li>identify the building codes that relate to the installation of insulation, vapour barrier and drywall</li> <li>identify and describe the different types of tapes, corner beads, adhesives and fastening devices used with gypsum board</li> </ul>	<p>Not only does insulation reduce heat loss, it also can retard the spread of sound and fire.</p>
<ul style="list-style-type: none"> <li>Material Application</li> </ul>	<ul style="list-style-type: none"> <li>describe methods of cutting, attaching, taping, filling, sanding and texturing a gypsum board</li> <li>describe methods of making repairs to small and large holes in a drywall surface</li> <li>identify the materials used to paint and decorate a wall surface</li> <li>research common methods used to apply paint to a surface; e.g., <ul style="list-style-type: none"> <li>brush</li> <li>roller</li> <li>spray.</li> </ul> </li> </ul>	<p>Avoid fillers that contain asbestos and paints that contain lead.</p>



## MODULE CON3030: WALL & CEILING FINISHING (continued)

Concept	Specific Learner Expectations	Notes
<b>Planning and Management</b> <ul style="list-style-type: none"> <li>Estimating</li> <li>Pre-installation Processes</li> <li>Health and Safety</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>estimate the amount and type of drywall, insulation, vapour barrier, paint and decorating supplies required to install and finish a wall or ceiling surface</li> <li>check alignment of studs and identify starting points</li> <li>mark stud locations on floor and ceiling</li> <li>install metal protectors for wiring and plumbing where necessary</li> <li>identify and locate appropriate personal protective equipment.</li> </ul>	<p>Students should be aware of the regulations regarding the transportation of dangerous goods and the use of hazardous materials.</p> <p>Refer to Materials Safety Data Sheets (MSDS) when using hazardous finishing and decorating supplies.</p>
<b>Implementation</b> <ul style="list-style-type: none"> <li>Material Processing</li> </ul>	<ul style="list-style-type: none"> <li>use the appropriate tools, materials and processes to:               <ul style="list-style-type: none"> <li>install insulation, vapour barrier and gypsum board</li> <li>tape, fill, sand, texture, paint as required</li> <li>repair a gypsum board surface</li> <li>seal, paint and/or apply a wall covering.</li> </ul> </li> </ul>	<p>If on-site work is unavailable, consider using a mock-up project.</p> <p>Stress the importance of using the proper personal protective equipment.</p>
<b>Assessment</b> <ul style="list-style-type: none"> <li>Career Information</li> <li>Career Preparation</li> </ul>	<ul style="list-style-type: none"> <li>describe the working conditions and skills required of a drywall mechanic and/or painter/decorator</li> <li>maintain a record of completed activities within a portfolio.</li> </ul>	



## MODULE CON3040: STAIR CONSTRUCTION

**Level:** Advanced

**Theme:** Building Systems (Processes and Applications)

**Prerequisite:** CON1070 Building Construction

**Module Description:** Students develop the knowledge and skills required to build a straight flight of stairs.

**Module Parameters:** Access to a building site and/or construction facility and to instruction from an individual with formal, specialized training in carpentry.

**Supporting Module:** CON2040 Framing Systems 1 (Floor & Wall)

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"><li>identify and describe different stair types, component parts and construction techniques</li><li>interpret building code regulations pertaining to residential stair design</li></ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"><li>presentation of a written research project that identifies and describes four different stair and stringer types</li><li>completion of a "Spec Sheet" that outlines the code requirements pertaining to a specific stair application.</li></ul> <i>Assessment Tool</i> <i>Research Process: Stair Construction, CON3040-1</i> <i>Standard</i> <i>The specifications should accurately address the allowable type and size of nosing, the amount of head room and unit rise and run</i> <i>Performance rating of 3 for each applicable task</i>	15  15



## MODULE CON3040: STAIR CONSTRUCTION (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>design, lay out and construct a straight flight of stairs</li> <li>demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>the construction of a full-size or scaled straight run stair containing no less than three cut-out dadoed or mitered risers.</li> </ul> <p><i>Assessment Tool</i>  <i>Activity Assessment; Stair Construction, CON3040-2</i></p> <p><i>Standard</i>  <i>The stair or model should conform in all ways to residential codes and standards and fit within the parameters of the stair well opening, total rise, headroom and nosing requirements. All dimensions are to be within <math>\pm 3</math> mm, and all joints should be tight and flush and finished as specified</i></p> <p><i>Performance rating of 3 for each applicable task</i></p> <ul style="list-style-type: none"> <li>observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>70</p> <p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p>Orientation</p> <ul style="list-style-type: none"> <li>Stair and Rail Construction</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>identify stair types, materials and methods of construction</li> <li>research and identify the parts of a stair and railing system</li> </ul>	<p>Refer to residential code requirements and Occupational Health and Safety guidelines.</p>



## MODULE CON3040: STAIR CONSTRUCTION (continued)

Concept	Specific Learner Expectations	Notes
<ul style="list-style-type: none"> <li>Stair and Rail Construction (continued)</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>describe the specific building code regulations regarding headroom, rise, run and railing specifications</li> <li>identify a typical layout procedure for a wooden stringer</li> <li>research methods of attaching and finishing treads and risers; e.g.:               <ul style="list-style-type: none"> <li>– housed</li> <li>– semi-housed</li> <li>– built-up stringer</li> <li>– notched stringer.</li> </ul> </li> </ul>	<p>Refer to local building codes.</p> <p>Explain the advantages and disadvantages of the various stair designs from the point of view of cost, ease of construction and strength.</p>
<p>Planning and Management</p> <ul style="list-style-type: none"> <li>Print Reading</li> <li>Estimating</li> </ul>	<ul style="list-style-type: none"> <li>read and interpret a drawing to determine the:               <ul style="list-style-type: none"> <li>– number of runs and risers</li> <li>– stair width</li> <li>– tread, riser and stringer dimensions</li> <li>– joints</li> <li>– types of materials and fasteners</li> <li>– guard and railing requirements</li> </ul> </li> <li>prepare a detailed material list and cost estimate.</li> </ul>	
<p>Implementation</p> <ul style="list-style-type: none"> <li>Material Processing</li> </ul>	<ul style="list-style-type: none"> <li>use the appropriate tools, materials and processes to:               <ul style="list-style-type: none"> <li>– prefabricate a set of stairs</li> <li>– install a suitable railing</li> <li>– check for code conformity.</li> </ul> </li> </ul>	
<p>Assessment</p> <ul style="list-style-type: none"> <li>Career Information</li> <li>Career Preparation</li> </ul>	<ul style="list-style-type: none"> <li>research business and career opportunities related to prefabricated stair construction and installation</li> <li>maintain a record of completed activities within a portfolio.</li> </ul>	



## MODULE CON3050: ROOF STRUCTURES 2 (FRAMING & COVERING)

**Level:** Advanced

**Theme:** Building Systems (Processes and Applications)

**Prerequisite:** CON2050 Roof Structures 1 (Framing & Finishing)

**Module Description:** Students develop basic competencies in laying out, cutting and assembling common and hip and valley rafters in relation to specialized structures and coverings.

**Module Parameters:** Access to a building site and/or construction facility and to instruction from an individual with formal, specialized training in carpentry.

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"><li>identify and describe the design features of intersecting sloped roofs</li><li>calculate the length of rafters, using ratio and proportion techniques</li></ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"><li>presentation of a written research project that identifies and graphically illustrates the design features and components of an intersecting roof</li></ul>	20
	<ul style="list-style-type: none"><li>accurate calculations related to the layout of common, hip, valley and jack rafters.</li></ul>	20
	<i>Assessment Tool</i> <i>Research Process: Rafter Construction, CON3050-1</i>	
	<i>Standard</i> <i>Line length should be calculated to the nearest mm</i> <i>Performance rating of 3 for each applicable task</i>	
<ul style="list-style-type: none"><li>lay out, cut and assemble a set of rafters for a roof assembly</li></ul>	<ul style="list-style-type: none"><li>application of layout, cutting and assembly skills to make at least one common, one hip or valley and two accompanying jack rafters.</li></ul>	60
	<i>Assessment Tool</i> <i>Activity Assessment: Rafter Cutting and Assembly, CON3050-2</i>	
	<i>Standard</i> <i>Rafters are shortened appropriately and cut to <math>\pm 3</math> mm of the correct length. Angles are within <math>\pm 1^\circ</math> and adjoining surfaces are tight fitting</i>	
	<i>Performance rating of 3 for each applicable task</i>	



# **MODULE CON3050: ROOF STRUCTURES 2 (FRAMING & COVERING) (continued)**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tools</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p><b>Orientation</b></p> <ul style="list-style-type: none"> <li>Roof Types and Design Features</li> <li>Roofing Materials</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>describe roof types and terminology</li> <li>explain how roof slopes are described and calculated</li> <li>explain the purpose of a roof overhang</li> <li>explain how roof dormers and Dutch gables are built</li> <li>describe three methods of determining the length of a common rafter</li> <li>describe the types of cuts and features of a: <ul style="list-style-type: none"> <li>common rafter</li> <li>hip and valley rafter</li> <li>hip and valley jack rafter</li> </ul> </li> <li>investigate and describe alternate roof coverings such as: <ul style="list-style-type: none"> <li>wood shakes</li> <li>metal shingle</li> <li>clay tiles.</li> </ul> </li> </ul>	<p>Students should note that flatter roofs require greater overhang to provide protection from the direct rays of the sun.</p> <p>Have students see how the Pythagorean Theorem can be applied to roof framing.</p>



**MODULE CON3050: ROOF STRUCTURES 2 (FRAMING & COVERING) (continued)**

Concept	Specific Learner Expectations	Notes
<b>Planning and Management</b> <ul style="list-style-type: none"> <li>Roof Calculations</li> <li>Work Scheduling</li> <li>Worker Safety</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>from a set of drawings and specifications, calculate the: <ul style="list-style-type: none"> <li>roof slope</li> <li>amount of overhang</li> <li>length of hip, valley and related jack rafters</li> </ul> </li> <li>sketch a rafter plan for a hip and valley roof system</li> <li>estimate the cost of at least one alternate roof covering</li> <li>create a work schedule and materials list</li> <li>lay out a rafter pattern for a given slope and type of rafter</li> <li>prepare and check the condition of required ladders and scaffolding.</li> </ul>	<p>Demonstrate how a framing square can be used to determine lengths of rafters and rafter cuts.</p> <p>Students should develop and use the slope gain factor.</p>
<b>Implementation</b> <ul style="list-style-type: none"> <li>Material Processing</li> </ul>	<ul style="list-style-type: none"> <li>for a given roof section use the appropriate tools, materials and techniques to: <ul style="list-style-type: none"> <li>lay out the required patterns</li> <li>cut the appropriate rafters to size</li> <li>assemble and fasten</li> <li>sheath and apply a sample of one or more alternate roof coverings.</li> </ul> </li> </ul>	
<b>Assessment</b> <ul style="list-style-type: none"> <li>Career Information</li> <li>Career Preparation</li> </ul>	<ul style="list-style-type: none"> <li>identify the skills required to be a successful roof framer and finisher</li> <li>maintain a record of completed activities within a portfolio.</li> </ul>	



## MODULE CON3060: DOORS & TRIM

**Level:** Advanced

**Theme:** Building Systems (Processes and Applications)

**Prerequisite:** CON1070 Building Construction

**Module Description:** Students apply basic finish carpentry knowledge and skills to install doors, railings and moldings.

**Module Parameters:** Access to a building site and/or construction facility and to instruction from an individual with formal, specialized training in carpentry.

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"><li>identify common types of doors, hardware and trim products</li></ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"><li>presentation of a written research project that correctly identifies the common types and sizes of sliding, folding and swing doors; related hardware and trim products.  <i>Assessment Tool</i> <i>Research Process: Installing Interior Doors and Trim, CON3060-1</i>  <i>Standard</i> <i>Performance rating of 3 for each applicable task</i></li></ul>	20
<ul style="list-style-type: none"><li>install doors, moldings and other trim products</li></ul>	<ul style="list-style-type: none"><li>installation of at least one door type and trim product.  <i>Assessment Tool</i> <i>Assessment Framework: Activity Assessment, CONACT</i>  <i>Standard</i> <i>The door frame should be plumb, appropriately secured and cased. The door should operate smoothly and trim products applied according to accepted trade practices</i> <i>Performance rating of 3 for each applicable task</i></li></ul>	70



# MODULE CON3060: DOORS & TRIM (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>create a profile of a trade or occupation within the finish carpentry field</li> <li>demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>presentation of an occupational profile that includes: <ul style="list-style-type: none"> <li>a description of the trade or occupation</li> <li>training requirements</li> <li>opportunities for career advancement and self-employment.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Research Process: Installing Interior Doors and Trim, CON3060-1</i></p> <p><i>Standard</i>  <i>Performance rating of 3 for each applicable task</i></p> <ul style="list-style-type: none"> <li>observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>10</p> <p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p>Orientation</p> <ul style="list-style-type: none"> <li>Materials</li> <li>Door Installation</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>list and describe the types of components and moldings that are used in conjunction with the installation and finishing of: <ul style="list-style-type: none"> <li>railings</li> <li>doors</li> <li>columns</li> <li>floors and ceiling</li> </ul> </li> <li>describe the different ways doors are constructed</li> <li>label the parts of a panel door.</li> <li>describe the common types of joints and methods of measuring and cutting used to install various moldings and casings such as miter, coped and butt joint.</li> </ul>	



**MODULE CON3060: DOORS & TRIM (continued)**

Concept	Specific Learner Expectations	Notes
<b>Planning and Management</b> <ul style="list-style-type: none"><li>• Estimating</li><li>• Prefinishing</li></ul>	<i>The student should:</i> <ul style="list-style-type: none"><li>• from a set of drawings:<ul style="list-style-type: none"><li>– identify the styles of moldings and calculate the amounts to be ordered to finish a wall section complete with door</li><li>– prefinish moldings and casing where possible.</li></ul></li></ul>	
<b>Implementation</b>	<ul style="list-style-type: none"><li>• use the appropriate tools, materials and processes to:<ul style="list-style-type: none"><li>– install prefabricated door or bifold unit</li><li>– install a lock set</li><li>– install room moldings and casings.</li></ul></li></ul>	
<b>Assessment</b> <ul style="list-style-type: none"><li>• Career Information</li><li>• Career Preparation</li></ul>	<ul style="list-style-type: none"><li>• identify employment and training opportunities related to finish carpentry</li><li>• describe personal interests and abilities related to making realistic career choices</li><li>• maintain a record of completed activities within a portfolio.</li></ul>	



## MODULE CON3070: FLOORCOVERING

**Level:** Advanced

**Theme:** Building Systems (Processes and Applications)

**Prerequisite:** CON1070 Building Construction

**Module Description:** Students develop skills in selecting and installing typical floor coverings used in residential, institutional and commercial buildings.

**Module Parameters:** Access to a building site and/or construction facility and to instruction from an individual with specialized training in floor covering.

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"><li>identify and describe common types of residential, institutional and commercial floor coverings</li><li>apply flooring skills to assist in the installation of a floor covering</li></ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"><li>presentation of a written research project that identifies and describes four major floor types (resilient sheet or tile, wood, ceramic and carpet).</li></ul> <i>Assessment Tool</i> <i>Research Process: Installing Floor Coverings, CON3070-1</i> <i>Standard</i> <i>Performance rating of 3 for each applicable task</i>	30
	<ul style="list-style-type: none"><li>demonstration of appropriate skills in the application of one or more flooring materials given an on-site or mock-up project.</li></ul> <i>Assessment Tool</i> <i>Assessment Framework: Activity Assessment, CONACT</i> <i>Standard</i> <i>Materials have been selected and installed in keeping with the manufacturer's recommendations and accepted trade practice. Joints are tight and patterns are aligned accurately; surfaces are smooth and free from blemishes</i> <i>Performance rating of 3 for each applicable task</i>	60



# **MODULE CON3070: FLOORCOVERING (continued)**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>create a profile of a trade or occupation within the floor covering field</li> <li>demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>presentation of an occupational report that includes a description of the working conditions, job opportunities and training requirements.</li> </ul> <p><i>Assessment Tool</i>  <i>Research Process: Installing Floor Coverings, CON3070-1</i></p> <p><i>Standard</i>  <i>Performance rating of 3 for each applicable task</i></p> <ul style="list-style-type: none"> <li>observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>10</p> <p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p>Orientation</p> <ul style="list-style-type: none"> <li>Floor Covering Materials</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>list and describe common types of residential and commercial floor covering materials; e.g.: <ul style="list-style-type: none"> <li>resilient (vinyl, rubber, cork)</li> <li>carpet</li> <li>ceramic tile</li> <li>wood</li> </ul> </li> <li>identify the factors that are used to determine the selection of a floor covering</li> <li>explain how concrete and wood floors differ in the way they are prepared for a floor covering</li> <li>identify appropriate adhesives and fasteners for a given covering</li> </ul>	



## MODULE CON3070: FLOORCOVERING (continued)

Concept	Specific Learner Expectations	Notes
<ul style="list-style-type: none"> <li>Installation Techniques</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>describe the processes used to:               <ul style="list-style-type: none"> <li>rough fit, seam and stretch a carpet</li> <li>rough fit and seam a vinyl covering</li> <li>lay out a floor surface for tile, parquet and wood flooring</li> <li>nail square edge and tongue-and-groove wood flooring</li> <li>fill, sand and finish a wood floor</li> <li>set, grout and seal ceramic tile.</li> </ul> </li> </ul>	<p>Discuss the issues related to removing an old floor covering and replacing it with a new one.</p>
<p>Planning and Management</p> <ul style="list-style-type: none"> <li>Estimating</li> </ul>	<ul style="list-style-type: none"> <li>describe the appropriate flooring for a given application</li> <li>calculate the cost of materials and supplies for a given area</li> <li>measure an area and prepare a layout sketch of starter courses.</li> </ul>	<p>If on-site work is unavailable, consider using a mock-up activity.</p>
<p>Implementation</p> <ul style="list-style-type: none"> <li>Material Processing</li> </ul>	<ul style="list-style-type: none"> <li>use the appropriate tools, materials and processes to:               <ul style="list-style-type: none"> <li>prepare a floor surface</li> <li>install a floor covering</li> <li>seal and finish where applicable.</li> </ul> </li> </ul>	
<p>Assessment</p> <ul style="list-style-type: none"> <li>Career Information</li> <li>Career Preparation</li> </ul>	<ul style="list-style-type: none"> <li>identify the employment and business opportunities related to the manufacture, installation and sale of floor coverings</li> <li>describe personal interests and abilities related to making realistic career choices</li> <li>maintain a record of completed activities within a portfolio.</li> </ul>	



## MODULE CON3080: ENERGY-EFFICIENT HOUSING

**Level:** Advanced

**Theme:** Building Systems (Processes and Applications)

**Prerequisite:** CON1070 Building Construction

**Module Description:** Students investigate construction practices and support systems to create an energy-efficient housing design.

**Module Parameters:** Access to a building site and/or construction facility and to instruction from an individual with specialized training in carpentry.

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"><li>• identify and describe energy-efficient construction materials and techniques</li></ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"><li>• a written report that correctly identifies and describes at least five types of energy efficient construction techniques and at least five energy efficient materials used in construction.</li></ul> <i>Assessment Tool</i> <i>Assessment Framework: Presentations/Reports, CTSPRE</i>	20
<ul style="list-style-type: none"><li>• calculate the energy efficiency of a typical residence or commercial structure</li></ul>	<i>Standard</i> <i>Performance rating of 3 for each applicable task</i> <ul style="list-style-type: none"><li>• the use of the appropriate programs to analyze and calculate the energy efficiency of a given house design</li></ul>	30
<ul style="list-style-type: none"><li>• write a proposal outlining how to improve the energy efficiency of a given building</li></ul>	<ul style="list-style-type: none"><li>• given the energy efficiency of a given building and knowledge of thermal resistance values of building materials, identifying at least five areas where the efficiency of a given building can be improved and the recommended procedures.</li></ul> <i>Assessment Tool</i> <i>Assessment Framework: Research Process, CTSRES</i> <i>Standard</i> <i>Performance rating of 3 for each applicable task</i>	50



**MODULE CON3080: ENERGY-EFFICIENT HOUSING (continued)**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
Orientation	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>identify the factors that have contributed to more energy efficient housing</li> <li>describe the construction techniques that are used in energy efficient buildings</li> <li>list and describe the materials that are used to improve the energy efficiency of a building</li> <li>define the term R factor</li> <li>describe the ways heat can enter or escape from a building</li> <li>describe corrective measures that can be undertaken in existing buildings to improve energy efficiency</li> <li>identify and describe passive and active heating and cooling systems</li> <li>research the effects of landscaping on the energy efficiency.</li> </ul>	
Implementation	<ul style="list-style-type: none"> <li>analyze an existing structure to estimate the heat loss through ceilings, walls, doors and windows</li> <li>prepare a proposal for an existing building outlining the work to be done to improve efficiency and its cost-effectiveness.</li> </ul>	<p>If possible, use a computer program to assist with the calculations.</p>



**MODULE CON3080: ENERGY-EFFICIENT HOUSING** (continued)

Concept	Specific Learner Expectations	Notes
Assessment <ul style="list-style-type: none"><li>• Career Information</li><li>• Career Preparation</li></ul>	<i>The student should:</i> <ul style="list-style-type: none"><li>• identify the employment and business opportunities related energy efficient research and design</li><li>• maintain a record of completed activities within a portfolio.</li></ul>	



## MODULE CON3090: RENOVATIONS/RESTORATIONS

**Level:** Advanced

**Theme:** Building Systems (Processes and Applications)

**Prerequisite:** CON1070 Building Construction

**Module Description:** Students work with a client to plan and complete a building renovation and/or restoration.

**Module Parameters:** Access to a building site and/or construction facility and to instruction from an individual with formal, specialized training in carpentry.

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"><li>complete a feasibility study and cost estimate of a renovation/restoration project</li></ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"><li>analysis of an existing building to determine the feasibility and cost of undertaking a given renovation and/or restoration project.</li></ul> <i>Assessment Tool</i> <i>Presentations/Reports: Building Renovation/Restoration Project, CON3090-1</i> <i>Standard</i> <i>The study will include an accurate description of the project and structural details, materials list, and time and cost estimate</i> <i>Performance rating of 3 for each applicable task</i>	30
<ul style="list-style-type: none"><li>apply construction skills to assist in a building renovation/restoration project, using traditional and modern construction materials and techniques</li></ul>	<ul style="list-style-type: none"><li>demonstration of appropriate planning, management, construction and teamwork skills to complete a building renovation/restoration project.</li></ul> <i>Assessment Tool</i> <i>Assessment Framework: Activity Assessment, CONACT</i> <i>Standard</i> <i>The renovation/restoration conforms to all local building codes and trade practices as well as meeting the client's expectations</i> <i>Performance rating of 3 for each applicable task</i>	70



# **MODULE CON3090: RENOVATIONS/RESTORATIONS (continued)**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p><b>Orientation</b></p> <ul style="list-style-type: none"> <li>Renovation Practices</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>identify the types of renovations that are most commonly carried out such as: <ul style="list-style-type: none"> <li>changing or adding windows</li> <li>creating a new entrance or opening a room</li> <li>building on an addition</li> <li>replacing exterior finish</li> </ul> </li> <li>identify what types of renovations require local permits or work that requires special skills and certification</li> <li>predict, by considering the age of the original building, the types of materials and construction techniques used in the original construction</li> <li>identify sources of information regarding construction methods and materials used in historical buildings</li> </ul>	<p>Besides new construction, students should be aware of the many opportunities for work related to building renovation and restoration.</p>
<ul style="list-style-type: none"> <li>Health and Safety</li> </ul>	<ul style="list-style-type: none"> <li>list the materials that for health reasons require special care when renovating</li> <li>identify local regulations regarding the disposal of hazardous materials.</li> </ul>	<p>Pay special attention to asbestos and lead paint that may have been used in older buildings.</p>



# MODULE CON3090: RENOVATIONS/RESTORATIONS (continued)

Concept	Specific Learner Expectations	Notes
<b>Planning and Management</b> <ul style="list-style-type: none"> <li>Renovation Proposal</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>prepare a feasibility study by determining: <ul style="list-style-type: none"> <li>– usefulness of the renovation</li> <li>– cost of materials and labour</li> <li>– disruption to the use of other living space</li> <li>– structural as well as aesthetic considerations</li> <li>– impact on support systems such as heating, lighting and plumbing</li> </ul> </li> <li>prepare a working drawing of a typical renovation</li> <li>prepare a work schedule for a typical renovation/restoration project.</li> </ul>	<p>Students should be aware that local planning authorities often will have a say in what can or cannot be done to a building particularly if it is considered to be a "Heritage Building."</p>
<b>Implementation</b> <ul style="list-style-type: none"> <li>Construction Process</li> </ul>	<ul style="list-style-type: none"> <li>apply planning, management and construction skills to complete a renovation and/or restoration project.</li> </ul>	
<b>Assessment</b> <ul style="list-style-type: none"> <li>Career Information</li> <li>Career Preparation</li> </ul>	<ul style="list-style-type: none"> <li>identify the employment opportunities and the establishment of an entrepreneurial venture associated with renovation work</li> <li>maintain a record of completed activities within a portfolio.</li> </ul>	

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## MODULE CON3100: COMMERCIAL STRUCTURES

**Level:** Advanced

**Theme:** Building Systems (Processes and Applications)

**Prerequisite:** CON1070 Building Construction

**Module Description:** Students investigate structural designs, construction techniques and work-site practices related to commercial construction.

**Module Parameters:** Access to a commercial construction site and/or construction facility and to instruction from an individual with formal, specialized training in carpentry.

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"><li>compare the differences between residential, institutional and commercial construction</li></ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"><li>presentation of a written report that compares residential, institutional and commercial construction on the basis of:<ul style="list-style-type: none"><li>the intended use</li><li>the nature of specifications and codes</li><li>types of foundations and superstructures</li><li>job site organization</li><li>specialized skills and trade requirements.</li></ul></li></ul> <i>Assessment Tool</i> <i>Assessment Framework: Presentations/Reports, CTSPRE</i>	20
<ul style="list-style-type: none"><li>describe common types of materials and construction techniques used in commercial construction</li></ul>	<i>Standard</i> <i>Performance rating of 3 for each applicable task</i> <ul style="list-style-type: none"><li>incorporation of common materials and construction techniques used in a model or in photographs and diagrams of a commercial/institutional construction project.</li></ul> <i>Assessment Tool</i> <i>Assessment Framework: Activity Assessment, CONACT</i> <i>Standard</i> <i>The model should be as realistic as possible and should maintain a set scale throughout. Photographs should show essential design features and structural materials and components</i> <i>Performance rating of 3 for each applicable task</i>	40



# **MODULE CON3100: COMMERCIAL STRUCTURES (continued)**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate commercial construction job site expectations and skill requirements</li> <li>demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>correct usage of appropriate rigging techniques and personal protective equipment.</li> </ul> <p><i>Standard</i>  <i>All procedures are performed according to accepted practices</i></p> <ul style="list-style-type: none"> <li>observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>40</p> <p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p>Orientation</p> <ul style="list-style-type: none"> <li>Foundations and Structural Systems</li> <li>Walls and Surfaces</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>identify the major differences between a residential and commercial/institutional construction project</li> <li>describe the techniques used to build a shallow and deep foundation for commercial/institutional buildings</li> <li>describe the various floor systems and components that are used in commercial/institutional construction</li> <li>compare structural steel framing techniques with those of reinforced concrete framing</li> <li>explain the advantage of using curtain walls in highrise buildings</li> <li>describe typical methods of installing utilities in commercial buildings</li> <li>identify common methods of finishing exterior and interior surfaces</li> </ul>	<p>Highlight different uses, construction techniques, building codes and working conditions.</p> <p>Students should be encouraged to visit a construction site and interview the workers.</p>



# MODULE CON3100: COMMERCIAL STRUCTURES (continued)

Concept	Specific Learner Expectations	Notes
<ul style="list-style-type: none"> <li>Worker Safety</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>identify the personal protective equipment that is required on the job site</li> <li>demonstrate the basic lift signals used on the construction site</li> <li>identify typical rigging techniques that are used to transport materials</li> <li>define the term safe working load</li> <li>describe correct methods of installing and securing scaffolding</li> <li>describe the role of a safety supervisor on a job site.</li> </ul>	<p>Demonstrate the proper use of ropes, chains and cables as well as shackles, hooks and knots.</p>
<p>Planning and Management</p>	<ul style="list-style-type: none"> <li>describe worker expectations on a typical job site</li> <li>list and describe the personal protective equipment required on a job site.</li> </ul>	
<p>Implementation</p>	<ul style="list-style-type: none"> <li>demonstrate the proper use of: <ul style="list-style-type: none"> <li>slings and hitches</li> <li>knots</li> <li>hand signals</li> </ul> </li> <li>produce a scale model or illustrated log that features common materials and techniques used in commercial/residential construction.</li> </ul>	
<p>Assessment</p> <ul style="list-style-type: none"> <li>Career Information</li> <li>Career Preparation</li> </ul>	<ul style="list-style-type: none"> <li>identify the working conditions, employment and training opportunities related to heavy construction</li> <li>maintain a record of completed activities within a portfolio.</li> </ul>	



## MODULE CON3110: SITE MANAGEMENT

**Level:** Advanced

**Theme:** Building Systems (Processes and Applications)

**Prerequisite:** CON1070 Building Construction

**Module Description:** Students consider the efficient and timely delivery of a quality product. They investigate and report on site management theories and practices to produce a project management plan.

**Module Parameters:** Access to appropriate in-school and community resources.

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"><li>• identify and describe the key elements of project management related to commercial and residential construction</li><li>• outline the roles and responsibilities of the principal players on a construction project</li><li>• apply site management theories and practices to create a management plan for a construction project</li></ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"><li>• identification and description of the major components and phases of project management plan</li><li>• accurate description of the roles and responsibilities of a project manager in relation to one or more key players found on a construction site</li><li>• development of a real or simulated management plan for a simple residential or light commercial project.</li></ul> <i>Assessment Tool</i> <i>Research Process, Management Principles and Practices, CON3110–1</i>  <i>Standard</i> <i>Performance rating of 3</i>	30  35  35



## MODULE CON3110: SITE MANAGEMENT (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p>Orientation</p> <ul style="list-style-type: none"> <li>Management Phases</li> <li>Planning</li> <li>Scheduling</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>identify the key elements of project management; e.g.: <ul style="list-style-type: none"> <li>planning</li> <li>scheduling</li> <li>implementing</li> <li>controlling</li> </ul> </li> <li>describe the roles and responsibilities of the project manager in relation to: <ul style="list-style-type: none"> <li>reviewing contractual agreements and deliverables</li> <li>establishing effective lines of communication with: <ul style="list-style-type: none"> <li>client</li> <li>suppliers</li> <li>contractors</li> <li>inspectors</li> </ul> </li> <li>determining site conditions and amenities; electrical, plumbing and gas supplies</li> </ul> </li> <li>compare the advantages and disadvantages of using the critical path and bar chart methods for scheduling a project</li> <li>identify strategies to help bring a project back on schedule</li> <li>describe the need for good communication and cooperation between various trades and occupations on a construction site</li> </ul>	<p>Have student understand that project management is the effective and efficient use of human and material resources.</p> <p>Discuss the importance of knowing the client's needs and being able to convey these to other players to avoid potential problems.</p> <p>If possible, use a computer program to plan a work schedule.</p> <p>Discuss the use of contingency time and running jobs in parallel.</p>



# **MODULE CON3110: SITE MANAGEMENT (continued)**

Concept	Specific Learner Expectations	Notes
<ul style="list-style-type: none"> <li>Implementing</li> <li>Controlling</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>identify the primary tasks of completing a project in relation to: <ul style="list-style-type: none"> <li>managing supplies</li> <li>managing contractors</li> <li>arranging inspections</li> <li>communicating with the client</li> <li>keeping records</li> </ul> </li> <li>research procedures to control: <ul style="list-style-type: none"> <li>safety on the work site</li> <li>quality of work</li> <li>removal and disposal of materials</li> <li>project costs.</li> </ul> </li> </ul>	<p>Lines of communication must be kept open between the key players. Records should also be kept to document work in progress and work that has been completed.</p> <p>Remind students that project managers must be aware of the personal health and safety as well as environmental issues related to new and renovated structures.</p>
<p>Implementation</p> <ul style="list-style-type: none"> <li>Planning</li> <li>Scheduling</li> <li>Worker Roles and Relationships</li> </ul>	<ul style="list-style-type: none"> <li>develop a work plan for a given project by determining: <ul style="list-style-type: none"> <li>what is to be done</li> <li>how it will be done</li> <li>who will do it</li> <li>when it should be done</li> </ul> </li> <li>schedule the work using a bar chart or critical path technique</li> <li>report on the roles and responsibilities for one or more of the following job site positions: <ul style="list-style-type: none"> <li>site superintendent</li> <li>safety supervisor</li> <li>subtrade contractor</li> <li>foreman</li> <li>skilled worker.</li> </ul> </li> </ul>	<p>If possible, have students use a computer program to develop a work schedule.</p>
<p>Assessment</p> <ul style="list-style-type: none"> <li>Quality Control</li> </ul>	<ul style="list-style-type: none"> <li>analyze a project and identify procedures to improve: <ul style="list-style-type: none"> <li>time management</li> <li>quality of work</li> <li>health and safety</li> <li>cost-efficiencies</li> </ul> </li> </ul>	



**MODULE CON3110: SITE MANAGEMENT** (continued)

Concept	Specific Learner Expectations	Notes
<ul style="list-style-type: none"><li>• Career Information</li><li>• Career Preparation</li></ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"><li>• identify the employment and business opportunities related to site management</li><li>• maintain a record of completed activities within a portfolio.</li></ul>	



## MODULE CON3120: TOOL MAINTENANCE

**Level:** Advanced

**Theme:** Manufacturing Systems (Processes and Applications)

**Prerequisite:** CON1010 Basic Tools & Materials

**Module Description:** Students develop skills in preventive maintenance by routinely inspecting and servicing production tools and equipment.

**Module Parameters:** Access to a materials and/or construction facility and to instruction from an individual with specialized training in hand and power tool maintenance.

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"><li>identify and describe the essential elements and desired outcomes of a preventive maintenance program</li><li>prepare a maintenance schedule for a piece of equipment</li><li>apply established maintenance procedures to assess and maintain hand and power tools</li></ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"><li>research project that correctly identifies and describes at least five positive outcomes of a preventive maintenance program</li></ul>	20
	<ul style="list-style-type: none"><li>development of a maintenance chart for a given power tool that identifies components and frequency of the service requirements.</li></ul> <p><i>Assessment Tool</i> <i>Assessment Framework: Research Process, CTSRES</i></p> <p><i>Standard</i> <i>Performance rating of 3 for each applicable task</i></p>	20
	<ul style="list-style-type: none"><li>ongoing student involvement in the assessment and maintenance of hand and power tools.</li></ul> <p><i>Assessment Tool</i> <i>Assessment Framework: Activity Assessment, CONACT</i></p> <p><i>Standard</i> <i>Tools are maintained according to accepted practice and the manufacturer's recommendations</i> <i>Performance rating of 3 for each applicable task</i></p>	60



## MODULE CON3120: TOOL MAINTENANCE (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p>Orientation</p> <ul style="list-style-type: none"> <li>Preventive Maintenance Components</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>explain reasons for establishing a preventive maintenance program</li> <li>identify the essential elements of a preventive maintenance program; e.g.: <ul style="list-style-type: none"> <li>scheduling and performing periodic maintenance functions</li> <li>repairing faulty equipment</li> <li>keeping records of service and maintenance work</li> <li>tagging or removing equipment that is out of order</li> </ul> </li> <li>show a list of parameters for setting up a maintenance schedule; e.g.: <ul style="list-style-type: none"> <li>age of equipment</li> <li>frequency of use</li> <li>manufacturer's recommendations</li> <li>past performance</li> </ul> </li> </ul>	<p>This module provides opportunity for senior students to become skilled in machine tool maintenance.</p>
<ul style="list-style-type: none"> <li>Tool Maintenance</li> </ul>	<ul style="list-style-type: none"> <li>identify recommended grinding and honing angles for: <ul style="list-style-type: none"> <li>plane irons</li> <li>wood chisels</li> <li>wood turning tools</li> </ul> </li> <li>calculate twist drill point angles and lip clearances for drilling metals and plastics</li> </ul>	<p>Demonstrate proper sharpening techniques for common edge cutting tools.</p>



## MODULE CON3120: TOOL MAINTENANCE (continued)

Concept	Specific Learner Expectations	Notes
<ul style="list-style-type: none"> <li>Equipment Maintenance</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>list and describe the types of adjustments and service requirements of a: <ul style="list-style-type: none"> <li>table saw</li> <li>band saw</li> <li>scroll saw</li> <li>jointer</li> <li>surface planer</li> <li>portable equipment</li> <li>drill press</li> <li>etc.</li> </ul> </li> <li>identify tools that require safety accessories such as a push stick.</li> </ul>	<p>Demonstrate appropriate methods to remove and install saw blades, cutting knives, sanding discs and belts.</p>
<p>Planning and Management</p> <ul style="list-style-type: none"> <li>Service Scheduling</li> </ul>	<ul style="list-style-type: none"> <li>prepare a service schedule for a number of production tools and pieces of equipment</li> <li>design a safety accessory for a specific tool.</li> </ul>	<p>Explain how machining flaws such as burns, skips or snips are a result of dull edges or improperly adjusted equipment.</p>
<p>Implementation</p> <ul style="list-style-type: none"> <li>Service and Maintenance</li> </ul>	<ul style="list-style-type: none"> <li>demonstrate a routine inspection of lab tools and equipment</li> <li>perform maintenance services as required</li> <li>build a safety accessory.</li> </ul>	<p>Have students consider making a fixed or adjustable taper jig, push block or other safety accessory.</p>
<p>Assessment</p> <ul style="list-style-type: none"> <li>Career Information</li> <li>Career Preparation</li> </ul>	<ul style="list-style-type: none"> <li>identify occupation and trade qualifications related to tool and machine maintenance</li> <li>maintain a record of completed activities within a portfolio.</li> </ul>	



## MODULE CON3130: FURNITURE MAKING 3 (LEG & RAIL)

**Level:** Advanced

**Theme:** Manufacturing Systems (Processes and Applications)

**Prerequisite:** CON1120 Project Management

**Module Description:** Students use solid and/or manufactured materials and leg-and-rail or pedestal construction techniques to build a free-standing piece of furniture.

**Module Parameters:** Access to a materials and/or construction facility and to instruction from an individual with formal, specialized training in furniture and cabinetmaking.

**Supporting Modules:** CON2130 Furniture Making 1 (Box Construction)  
CON2140 Furniture Making 2 (Frame & Panel)

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"><li>identify and describe the design features and joinery techniques of a typical leg-and-rail piece of furniture</li><li>apply drawing and estimating skills and techniques to prepare a shop drawing, detailed material list and cost estimate</li><li>plan and build a piece of furniture, using leg-and-rail construction techniques</li></ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"><li>analysis of a working drawing to determine the construction details of a leg-and-rail or pedestal piece of furniture</li><li>application of technical drawing and estimating skills to make an accurate material list and cost estimate</li><li>application of advanced joinery and finishing skills and techniques used to make a leg-and-rail or pedestal product.</li></ul> <i>Assessment Tool</i> <i>Project Assessment: Leg-and-Rail Construction, CON3130-1</i> <i>Standard</i> <i>The finished product will be constructed using the appropriate materials, joinery and finishing techniques. Joints are to be flush, tight fitting and square; finished surfaces are to be smooth and free from production defects. Overall dimensions should be within <math>\pm 2</math> mm</i> <i>Performance rating of 3 for each applicable task</i>	10  20  70



# **MODULE CON3130: FURNITURE MAKING 3 (LEG & RAIL) (continued)**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p>Orientation</p> <ul style="list-style-type: none"> <li>Leg-and-Rail Construction</li> <li>Table Construction</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>describe typical design and joinery techniques used in leg-and-rail and pedestal construction</li> <li>identify common methods and fastening systems to secure a wood top to an under-frame; e.g.: <ul style="list-style-type: none"> <li>wood buttons</li> <li>metal plates</li> <li>pocket drilling</li> <li>blocks</li> </ul> </li> <li>describe common methods of transferring a pattern to a work piece such as a table leg or pedestal</li> <li>describe an appropriate method to reed and flute a surface.</li> </ul>	<p>Discuss the issue of form and function when investigating various leg-and-rail and/or pedestal design.</p>



# **MODULE CON3130: FURNITURE MAKING 3 (LEG & RAIL) (continued)**

Concept	Specific Learner Expectations	Notes
<b>Planning and Management</b> <ul style="list-style-type: none"> <li>• Product Design</li> <li>• Work Scheduling and Estimating</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• select a product that requires the use of: <ul style="list-style-type: none"> <li>– leg-and-rail or pedestal components</li> <li>– solid woods and/or composite materials</li> </ul> </li> <li>• interpret a working drawing to prepare a detailed material list and event schedule</li> <li>• design and build the required jigs and templates.</li> </ul>	
<b>Implementation</b> <ul style="list-style-type: none"> <li>• Material Processing</li> </ul>	<ul style="list-style-type: none"> <li>• use the appropriate tools, material and processes to: <ul style="list-style-type: none"> <li>– measure and lay out stock</li> <li>– cut and shape components</li> <li>– machine appropriate joints</li> <li>– assemble with suitable fasteners</li> <li>– prepare for finishing.</li> </ul> </li> </ul>	<p>The project may be finished in conjunction with CON2150: Finishing &amp; Refinishing.</p>
<b>Assessment</b> <ul style="list-style-type: none"> <li>• Career Information</li> <li>• Career Preparation</li> </ul>	<ul style="list-style-type: none"> <li>• identify the further educational and skill-building opportunities related to custom furniture making</li> <li>• maintain a record of completed activities within a portfolio.</li> </ul>	



## MODULE CON3140: FURNITURE MAKING 4 (SURFACE ENHANCEMENT)

**Level:** Advanced

**Theme:** Manufacturing Systems (Processes and Applications)

**Prerequisite:** CON1120 Project Management

**Module Description:** Students explore and demonstrate the use of veneer, inlay, carving and/or marquetry techniques to enhance the appearance of a product or component.

**Module Parameters:** Access to a materials and/or construction facility and to instruction from an individual with formal, specialized training in furniture and cabinetmaking.

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"><li>identify and describe methods of matching wood veneer</li><li>differentiate between inlay, marquetry and carving techniques</li><li>create a veneer, inlay or carving feature for a product or component</li></ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"><li>a written response that correctly identifies and describes at least four methods of matching wood veneer</li></ul>	15
	<ul style="list-style-type: none"><li>a written response that correctly identifies the differences between inlay, marquetry and carving techniques.</li></ul>	15
	<i>Assessment Tool</i> <i>Response Assessment: Surface Enhancements, CON3140-1</i>	
	<i>Standard</i> <i>Performance rating of 3 for each applicable task</i> <ul style="list-style-type: none"><li>application of veneering/inlaying or carving skills and techniques on a component or a product.</li></ul> <i>Assessment Tool</i> <i>Assessment Framework: Project Assessment, CONPRO</i> <i>Standard</i> <i>The enhancement will be tight fitting, appropriately matched and detailed using materials that add to the overall appearance and value of the product</i> <i>Performance rating of 3 for each applicable task</i>	70







**MODULE CON3140: FURNITURE MAKING 4 (SURFACE ENHANCEMENT) (continued)**

Concept	Specific Learner Expectations	Notes
<b>Planning and Management</b> <ul style="list-style-type: none"> <li>• Product Selection</li> <li>• Design</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• identify a product or component that: <ul style="list-style-type: none"> <li>– requires veneering</li> <li>– is enhanced by a carved, inlaid or marquetry feature</li> </ul> </li> <li>• select an appropriate veneer</li> <li>• sketch the desired veneer match</li> <li>• sketch a design for a carved, inlaid or marquetry feature.</li> </ul>	
<b>Implementation</b>	<ul style="list-style-type: none"> <li>• use appropriate tools, materials and processes to: <ul style="list-style-type: none"> <li>– cut and fit the veneer</li> <li>– apply and glue a veneer</li> <li>– create an inlay, marquetry or carving feature.</li> </ul> </li> </ul>	
<b>Assessment</b> <ul style="list-style-type: none"> <li>• Career Information</li> <li>• Career Preparation</li> </ul>	<ul style="list-style-type: none"> <li>• identify the employment and business opportunities related to advanced furniture making</li> <li>• maintain a record of completed activities within a portfolio.</li> </ul>	



## MODULE CON3150: FURNITURE REPAIR

**Level:** Advanced

**Theme:** Manufacturing Systems (Processes and Applications)

**Prerequisite:** CON1120 Project Management

**Module Description:** Students apply basic knowledge of furniture construction and materials to repair or replace existing components or coverings.

**Module Parameters:** Access to a materials and/or construction facility and to instruction from an individual with formal, specialized training in carpentry/cabinetry.

**Supporting Modules:** CON2150 Finishing & Refinishing  
FAS2150 Upholstery [Fashion Studies Strand]

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"><li>• assess the condition of a piece of furniture to determine whether it can be economically repaired or restored</li><li>• prepare a repair/restoration plan and cost estimate</li><li>• repair/restore a piece of furniture</li></ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"><li>• the analysis of an existing piece of furniture to determine the feasibility of repairing or restoring the product</li><li>• the development of a repair/restoration plan and estimate for a given piece of furniture or millwork</li><li>• the application of repair and restoration skills.</li></ul> <i>Assessment Tool</i> <i>Project Assessment: Repairing/Restoring Furniture, CON3150-1</i>  <i>Standard</i> <i>The integrity and usefulness of the product have been maintained while meeting the clients needs and expectations</i> <i>Performance rating of 3 for each applicable task</i>	20  15  65



## MODULE CON3150: FURNITURE REPAIR (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p><b>Orientation</b></p> <ul style="list-style-type: none"> <li>Furniture Appraisal</li> <li>Repair and Restoration Techniques</li> <li>Health and Safety</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>identify the factors that determine whether a piece of furniture is worth repairing or restoring</li> <li>describe safe and efficient methods to: <ul style="list-style-type: none"> <li>loosen old glue and clean joints</li> <li>remove and replace dowel pins</li> <li>tighten loose joints</li> <li>patch or repair a veneer surface</li> <li>splice a component</li> <li>repair and/or replace a plastic molding</li> </ul> </li> <li>identify practical methods to determine the nature of the original structural materials and finishes</li> <li>identify the design features that might have caused a component to fail</li> <li>describe the hazards associated with stripping old paint, varnish and lacquer finishes.</li> </ul>	<p>Encourage students to establish the restored and unrestored value of a piece of furniture before work begins.</p> <p>Discuss the use of common adhesives such as:</p> <ul style="list-style-type: none"> <li>animal</li> <li>casein</li> <li>white liquid resin</li> <li>yellow resin glue</li> <li>epoxy cement</li> <li>contact cement</li> <li>heat activated glue.</li> </ul> <p>Associating failures with a specific design will help students design features better products in the future.</p>



**MODULE CON3150: FURNITURE REPAIR (continued)**

Concept	Specific Learner Expectations	Notes
<b>Planning and Management</b> <ul style="list-style-type: none"><li>• Feasibility Study</li><li>• Estimating</li></ul>	<i>The student should:</i> <ul style="list-style-type: none"><li>• describe the overall condition and feasibility of restoring a given piece of furniture</li><li>• estimate the time, supply and material cost to:<ul style="list-style-type: none"><li>– disassemble</li><li>– strip down</li><li>– repair</li><li>– reassemble</li><li>– refinish.</li></ul></li></ul>	
<b>Implementation</b>	<ul style="list-style-type: none"><li>• use the appropriate tools, materials and processes to repair and restore a piece of furniture.</li></ul>	
<b>Assessment</b> <ul style="list-style-type: none"><li>• Career Information</li><li>• Career Preparation</li></ul>	<ul style="list-style-type: none"><li>• research employment and business opportunities pertaining to furniture repair and restoration</li><li>• maintain a record of completed activities within a portfolio.</li></ul>	



**MODULE CON3160: CABINETMAKING 3 (CABINETS/COUNTERTOPS)****Level:** Advanced**Theme:** Manufacturing Systems (Processes and Applications)**Prerequisite:** CON1120 Project Management**Module Description:** Students develop the knowledge and skills required to build and install a simple cabinet/countertop complete with an appropriate backsplash and edge treatment.**Module Parameters:** Access to a materials and/or construction facility and to instruction from an individual with formal, specialized training in carpentry/cabinetry.**Supporting Module:** CON1160 Manufactured Materials**Curriculum and Assessment Standards**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"><li>identify and describe common types of cabinets/countertops and installation procedures</li></ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"><li>the presentation of a written report that demonstrates knowledge of:<ul style="list-style-type: none"><li>types of countertops currently used in cabinet production</li><li>ways in which edges may be concealed to produce an esthetically pleasing product</li><li>common methods of countertop installation with particular emphasis on fastener concealment.</li></ul></li></ul> <i>Assessment Tool</i> <i>Assessment Framework: Presentations/Reports, CTSPRE</i>	15
<ul style="list-style-type: none"><li>identify and describe a suitable edge treatment for a given application</li></ul>	<i>Standard</i> <i>Performance rating of 3 for each applicable task</i> <ul style="list-style-type: none"><li>development of a mock-up or sample display of at least two different edge treatments.</li></ul> <i>Assessment Tool</i> <i>Assessment Framework: Activity Assessment, CONACT</i> <i>Standard</i> <i>Samples should be securely bonded. Edges should be flush and free of sharp corners or chips and traces of cement</i> <i>Performance rating of 3 for each applicable task</i>	15



**MODULE CON3160: CABINETMAKING 3 (CABINETS/COUNTERTOPS) (continued)**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• apply/install a given material to produce a suitable cabinet/countertop</li> <li>• demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• construction and installation of a cabinet/countertop for a given application.</li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Framework: Activity Assessment, CONACT</i></p> <p><i>Standard</i>  <i>The cabinet/countertop dimensions should be accurate to within 1 mm of the specifications and the finished product should be completely free of finish blemishes. An accepted and appropriate edge treatment should be employed, and any fasteners used in its application should be concealed</i></p> <p><i>Performance rating of 3</i></p> <ul style="list-style-type: none"> <li>• observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>70</p> <p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p>Orientation</p> <ul style="list-style-type: none"> <li>• Types of Materials</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• identify common countertop materials: <ul style="list-style-type: none"> <li>– ceramic tile</li> <li>– plastic laminate</li> <li>– natural and synthetic marble</li> <li>– molded laminates</li> </ul> </li> <li>• identify typical methods and materials used to seal components</li> </ul>	



**MODULE CON3160: CABINETMAKING 3 (CABINETS/COUNTERTOPS) (continued)**

Concept	Specific Learner Expectations	Notes
<ul style="list-style-type: none"> <li>Application Techniques</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>describe the processes used to:                             <ul style="list-style-type: none"> <li>apply ceramic tile</li> <li>apply plastic laminates</li> <li>install manufactured tops</li> </ul> </li> <li>identify and describe typical edge treatments used with a given cabinet/countertop material</li> <li>describe standard procedures to:                             <ul style="list-style-type: none"> <li>cut and trim plastic laminates</li> <li>cut ceramic tile.</li> </ul> </li> </ul>	
Health and Safety	<ul style="list-style-type: none"> <li>list and demonstrate the safe use of power tools used to install cabinet/countertop materials</li> <li>describe the health and safety issues that pertain to the use of specific solvents and adhesives.</li> </ul>	
<p>Planning and Management</p> <ul style="list-style-type: none"> <li>Material Selection</li> <li>Work Scheduling</li> </ul>	<ul style="list-style-type: none"> <li>select the appropriate material and edge treatment for a given application</li> <li>prepare a detailed material and procedural list</li> <li>identify and note the location of fixtures.</li> </ul>	The skills in this module can be assessed on a full-size project or on a mock-up.
<p>Implementation</p> <ul style="list-style-type: none"> <li>Material Processing</li> </ul>	<ul style="list-style-type: none"> <li>use the appropriate tools, materials and processes to:                             <ul style="list-style-type: none"> <li>measure and mark stock</li> <li>cut and fit materials</li> <li>attach component</li> <li>apply materials and edge treatment</li> <li>locate and prepare openings for fixtures</li> <li>clean and seal.</li> </ul> </li> </ul>	Stress the importance of using personal protective equipment, particularly related to tile cutting and use of power tools.



**MODULE CON3160: CABINETMAKING 3 (CABINETS/COUNTERTOPS) (continued)**

Concept	Specific Learner Expectations	Notes
<p>Assessment</p> <ul style="list-style-type: none"><li>• Career Information</li><li>• Career Preparation</li></ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"><li>• identify the employment and business opportunities related to the installation of cabinet/countertops</li><li>• maintain a record of completed activities within a portfolio.</li></ul>	



**MODULE CON3170: CABINETMAKING 4 (LAYOUT & INSTALLATION)****Level:** Advanced**Theme:** Manufacturing Systems (Processes and Applications)**Prerequisite:** CON1120 Project Management**Module Description:** Students develop a floor/wall cabinet plan and order and install a set of prebuilt cabinets.**Module Parameters:** Access to a building site and/or construction facility and to instruction from an individual with formal, specialized training in carpentry/cabinetry.**Curriculum and Assessment Standards**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>design a room layout and prepare a cabinet schedule</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>the development of a scale drawing in plan view, accompanied by preliminary sketches and a complete cabinet schedule.</li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Framework: Activity Assessment, CONACT</i></p> <p><i>Standard</i>  <i>The layout should conform to the principles of the work triangle and meet current standards for depth, height and distances between upper and lower cabinets and allowances for appliances. The cabinet schedule should be fully detailed and contain accurate measurements. A master layout or story pole should accompany the drawing</i>  <i>Performance rating of 3 for each applicable task</i></p>	20
<ul style="list-style-type: none"> <li>lay out and install a set of cabinets and countertops</li> </ul>	<ul style="list-style-type: none"> <li>the installation of a set of cabinets and countertop is in a mock-up or actual job site situation.</li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Framework: Activity Assessment, CONACT</i></p> <p><i>Standard</i>  <i>Components are positioned according to the layout drawing, levelled and securely fastened. Components, fillers and countertops are scribe fit where needed. Doors and drawers are aligned and tested</i>  <i>Performance rating of 3 for each applicable task</i></p>	65



**MODULE CON3170: CABINETMAKING 4 (LAYOUT & INSTALLATION) (continued)**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>create a profile of a trade or occupation within the cabinetmaking field</li> <li>demonstrate basic competencies:</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>presentation of an occupation profile that outlines: <ul style="list-style-type: none"> <li>employment opportunities</li> <li>training and entry requirements</li> <li>working conditions.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Framework: Research Process, CTSRES</i></p> <p><i>Standard</i>  <i>Performance rating of 3 for each applicable task</i></p> <ul style="list-style-type: none"> <li>observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>15</p> <p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
Orientation	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>identify and describe the principles of various kitchen, bathroom and workroom layouts</li> <li>describe the procedures used to level a set of cabinets</li> <li>describe the techniques and fasteners used to attach cabinets together, to the floor, ceiling and wall structures.</li> </ul>	<p>Discuss the principle of the work triangle in kitchen or other work space.</p>



**MODULE CON3170: CABINETMAKING 4 (LAYOUT & INSTALLATION)** (continued)

Concept	Specific Learner Expectations	Notes
Planning and Management	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• use a set of drawings and specifications to determine the size, location and type of modular units</li> <li>• prepare a story pole or master layout on plywood or cardboard for a specified section of a cabinet installation</li> <li>• check and note irregularities in walls and floors</li> <li>• identify cabinet modifications owing to irregularities and service outlets.</li> </ul>	Use a CAD system if possible.
Implementation	<ul style="list-style-type: none"> <li>• use the appropriate tools, materials and processes to: <ul style="list-style-type: none"> <li>– locate and level units</li> <li>– assemble and install units</li> <li>– install countertops</li> <li>– apply fillers and moldings</li> <li>– adjust fit of doors and drawers.</li> </ul> </li> </ul>	Besides a regular kitchen, consider a child's play kitchen as a possible project.
<p>Assessment</p> <ul style="list-style-type: none"> <li>• Career Information</li> <li>• Career Preparation</li> </ul>	<ul style="list-style-type: none"> <li>• identify employment opportunities related to: <ul style="list-style-type: none"> <li>– kitchen and bathroom design</li> <li>– cabinet manufacturing</li> <li>– installing cabinets</li> </ul> </li> <li>• describe personal interests and abilities related to making realistic career choices</li> <li>• maintain a record of completed activities within a portfolio.</li> </ul>	



## MODULE CON3190: PRODUCTION PLANNING

**Level:** Advanced

**Theme:** Manufacturing Systems (Processes and Applications)

**Prerequisite:** CON2200 Product Development

**Module Description:** Students plan, individually or as team members, a production system, and create the necessary work cells and floor plan to produce a given product in a safe and efficient manner.

**Module Parameters:** Access to a building site and/or construction facility and to instruction from an individual with specialized training in production work.

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"><li>• identify the characteristics of an efficient production system</li><li>• analyze a product to determine the necessary production processes and tools</li><li>• create a production flow chart and/or facility layout</li><li>• demonstrate basic competencies.</li></ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"><li>• presentation of a written report that outlines the elements that contribute to the development of an efficient production system</li><li>• analysis of a given product to determine the tools, materials and processes to create a production flow chart and locate the required jigs, fixtures and tools.</li></ul> <i>Assessment Tool</i> <i>Presentations/Reports: Planning for Efficiency, CON3190-1</i> <i>Standard</i> <i>Performance rating of 3 for each applicable task</i> <ul style="list-style-type: none"><li>• observations of individual effort and interpersonal interaction during the learning process.</li></ul> <i>Assessment Tool</i> <i>Basic Competencies Reference Guide and any assessment tools noted above</i>	15  70  15   Integrated throughout



# **MODULE CON3190: PRODUCTION PLANNING (continued)**

Concept	Specific Learner Expectations	Notes
<p>Orientation</p> <ul style="list-style-type: none"> <li>Production Methods</li> <li>Health and Safety</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>describe the factors that determine whether a product part or component will be built or purchased</li> <li>describe the production methods that are used to separate, combine and form materials</li> <li>describe common methods of material and product handling</li> <li>identify the conditions that contribute to a efficient production system; e.g.: <ul style="list-style-type: none"> <li>use of flexible equipment</li> <li>zero tolerance</li> <li>multi-skilled work teams</li> <li>authority delegated to the workers</li> </ul> </li> <li>identify methods to control: <ul style="list-style-type: none"> <li>inventory</li> <li>production</li> <li>quality</li> </ul> </li> <li>list and describe typical safety regulations that govern: <ul style="list-style-type: none"> <li>space between equipment</li> <li>type of floor surfaces</li> <li>amount of light</li> <li>air quality control.</li> </ul> </li> </ul>	<p>It may be more economical to purchase a part than to make it.</p> <p>Consider ways to avoid "bottlenecks" and back-tracking.</p> <p>Discuss the move back to building a complete product using a team approach rather than using mass production techniques.</p>
Planning and Management	<ul style="list-style-type: none"> <li>break a given product down into its separate parts and identify how each part can be fabricated</li> <li>show a flow chart for the movement of materials and products</li> <li>train personnel for specific tasks.</li> </ul>	
Implementation	<ul style="list-style-type: none"> <li>design and build the necessary jigs, fixtures and templates for a given part and process</li> <li>organize the required equipment to create a required work cell or shop layout.</li> </ul>	



**MODULE CON3190: PRODUCTION PLANNING** (continued)

Concept	Specific Learner Expectations	Notes
<b>Assessment</b> <ul style="list-style-type: none"><li>• Quality Control</li><li>• Career Preparation</li></ul>	<i>The student should:</i> <ul style="list-style-type: none"><li>• test and improve the production processes if necessary</li><li>• maintain a record of completed activities within a portfolio.</li></ul>	



<b>MODULE CON3200: PRODUCTION MANAGEMENT</b>	
<b>Level:</b>	Advanced
<b>Theme:</b>	Manufacturing Systems (Processes and Applications)
<b>Prerequisite:</b>	CON3190 Production Planning
<b>Module Description:</b>	Students identify and enhance management skills in relation to the development and deployment of people and physical resources.

**Theme:** Manufacturing Systems (Processes and Applications)

**Module Description:** Students identify and enhance management skills in relation to the development and deployment of people and physical resources.

## Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>describe effective production management strategies</li> <li>develop a system to manage and schedule work and to control materials and completed products</li> <li>use effective management skills to operate an efficient production system</li> <li>demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>presentation of a written report that outlines the role of management in relationship to planning, organizing and allocating resources</li> <li>describes a system to schedule work, order and inventory materials and track completed products</li> <li>implementation of a management plan to produce a given product.</li> </ul> <p><i>Assessment Tool</i>  <i>Presentations/Reports: Quality Management, CON3200-1</i></p> <p><i>Standard</i>  <i>Performance rating of 3 for each applicable task</i></p> <ul style="list-style-type: none"> <li>observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>35</p> <p>65</p> <p>Integrated throughout</p>



## MODULE CON3200: PRODUCTION MANAGEMENT (continued)

Concept	Specific Learner Expectations	Notes
<b>Orientation</b> <ul style="list-style-type: none"> <li>• Role of Management</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• define the role of management in a production system</li> <li>• identify and describe the key management elements; e.g.: <ul style="list-style-type: none"> <li>– planning</li> <li>– organizing</li> <li>– leading</li> <li>– controlling</li> </ul> </li> <li>• identify the functions that are the responsibility of a management team; e.g.: <ul style="list-style-type: none"> <li>– marketing</li> <li>– research and development</li> <li>– production</li> <li>– servicing</li> <li>– finance</li> <li>– training.</li> </ul> </li> </ul>	<p>Students should be asked to participate in management activities as well as in production.</p> <p>Discuss total quality management principles.</p>
<b>Management Techniques</b>	<ul style="list-style-type: none"> <li>• identify and describe typical scheduling techniques used by production managers such as a PERT chart (Program Evaluation Review Technique)</li> <li>• differentiate between quality control and total quality management</li> <li>• compare labour–management relations in a traditional and automated settings</li> <li>• describe the role government has in overseeing production such as: <ul style="list-style-type: none"> <li>– Occupational Health and Safety</li> <li>– Workers' Compensation</li> <li>– Alberta Environmental Protection.</li> </ul> </li> </ul>	
<b>Implementation</b> <ul style="list-style-type: none"> <li>• Scheduling</li> </ul>	<ul style="list-style-type: none"> <li>• prepare a PERT chart or other scheduling device for a production project</li> </ul>	



**MODULE CON3200: PRODUCTION MANAGEMENT (continued)**

Concept	Specific Learner Expectations	Notes
<ul style="list-style-type: none"><li>• Business Plan</li><li>• Working Conditions and Relations</li></ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"><li>• produce a simple business plan by outlining its purpose, performing a cash flow analysis and predicting its profitability</li><li>• plan, implement and monitor a safety program for a production project</li></ul> <p>OR</p> <ul style="list-style-type: none"><li>• create a system to improve working conditions and job satisfaction.</li></ul>	
<p>Assessment</p> <ul style="list-style-type: none"><li>• Career Information</li><li>• Career Preparation</li></ul>	<ul style="list-style-type: none"><li>• describe the career preparation and management opportunities related to a production industry</li><li>• maintain a record of completed activities within a portfolio.</li></ul>	



## MODULE CON3210: FRAMING SYSTEMS 2 (FLOOR, WALL & CEILING)

**Level:** Advanced

**Theme:** Building Systems (Processes and Applications)

**Prerequisite:** CON2040 Framing Systems 1 (Floor & Wall)

**Module Description:** Students develop appropriate layout and assembly skills to install conventional and/or engineered framing components associated with residential and/or light commercial construction.

**Module Parameters:** Access to a building site and/or construction facility and to instruction from an individual with formal, specialized training in carpentry.

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"><li>compare conventional and engineered framing systems and components</li></ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"><li>a written or oral response that describes and compares the components and procedures used to construct a floor, wall and ceiling frame and support system using conventional lumber and engineered components.  <i>Assessment Tool</i> <i>Response Assessment: Framing Systems, CON3210-1</i>  <i>Standard</i> <i>Response rating of 3</i></li></ul>	20
<ul style="list-style-type: none"><li>apply print-reading and estimating principles to prepare a material list and cost estimate for a structure that incorporates conventional and/or engineered framing components</li></ul>	<ul style="list-style-type: none"><li>preparation of a framing plan, material list and cost estimate given a typical residential or light commercial drawing and span tables</li></ul>	15
<ul style="list-style-type: none"><li>demonstrate advanced framing, layout and assembly skills</li></ul>	<ul style="list-style-type: none"><li>observation of framing skills through on-site and/or in-shop work.  <i>Assessment Tool</i> <i>Construction Activity: Framing, CON3210-2</i>  <i>Standard</i> <i>Performance rating of 3 for each applicable task</i></li></ul>	65



# **MODULE CON3210: FRAMING SYSTEMS 2 (FLOOR, WALL & CEILING) (continued)**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student assessment should be based on:</i></p> <ul style="list-style-type: none"> <li>observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p>Orientation</p> <ul style="list-style-type: none"> <li>Floor Support Systems</li> <li>Framing Systems</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>describe the parts of a typical residential floor and wall frame and support system</li> <li>identify and describe two common types of posts used in floor framing support systems</li> <li>compare the advantages and disadvantages of: <ul style="list-style-type: none"> <li>built-up beams</li> <li>solid timber beams</li> <li>laminated beams</li> <li>steel beams</li> </ul> </li> <li>compare the advantages and disadvantages of using: <ul style="list-style-type: none"> <li>conventional framing materials</li> <li>truss joists</li> <li>wooden I-beams</li> <li>metal joists/studs</li> </ul> </li> <li>identify and describe typical procedures that are used to join floor joists to a foundation or wall section</li> </ul>	<p>Discuss the effects that live and dead loads, lateral pressure and intermittent loads have on the design of a structure.</p> <p>Explain how to construct a built-up beam to meet Alberta Building Code requirements.</p> <p>Explain how joists can be embedded, accommodate a brick finish or be attached to a sill plate.</p>



# **MODULE CON3210: FRAMING SYSTEMS 2 (FLOOR, WALL & CEILING) (continued)**

Concept	Specific Learner Expectations	Notes
<p><b>Orientation</b></p> <ul style="list-style-type: none"> <li>Framing Systems (continued)</li> <li>Floor and Wall Restraining, Notching and Drilling</li> <li>Floor and Wall Sheathing</li> <li>Health and Safety Issues</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>compare different methods used to attach floor joists to steel and built-up beams</li> <li>identify typical framing procedures used in relation to: <ul style="list-style-type: none"> <li>load and non-load bearing partitions</li> <li>stair, chimney and stack openings</li> <li>parallel and 90° cantilevers</li> </ul> </li> <li>identify and describe common methods of bridging floors and bracing walls: <ul style="list-style-type: none"> <li>cross-bridging</li> <li>continuous wood strapping</li> <li>solid blocking</li> <li>continuous steel strapping</li> </ul> </li> <li>identify code requirements related to notching and drilling floor joists and wall studs</li> <li>identify common types of sub-flooring materials, underlayments and wall sheathing</li> <li>identify the purpose and types of connectors/ties and adhesives that are used in conjunction with the application of flooring and sheathing components</li> <li>identify appropriate methods to cover floor/wall openings and construct temporary railings to code</li> <li>describe safe operation of portable electric and air activated hand tools</li> <li>identify appropriate personal protective equipment used on the job site.</li> </ul>	<p>Discuss the use of joist hangers and ledger boards.</p> <p>Discuss code requirements for installing a sub-floor and wall covering.</p>



**MODULE CON3210: FRAMING SYSTEMS 2 (FLOOR, WALL & CEILING) (continued)**

Concept	Specific Learner Expectations	Notes
<b>Planning and Management</b> <ul style="list-style-type: none"> <li>Estimating</li> </ul>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>use the appropriate tables to determine the clear spans, actual lengths of joists/headers for a variety of framing materials and applications</li> <li>estimate the size and quantities of materials required to construct a floor/wall/ceiling system.</li> </ul>	<p>Engineered components should be sized to eliminate waste.</p>
<b>Implementation</b> <ul style="list-style-type: none"> <li>Construction Techniques</li> <li>Health and Safety</li> </ul>	<ul style="list-style-type: none"> <li>develop skills in relation to: <ul style="list-style-type: none"> <li>built up beam and header construction and installation</li> <li>cutting, layout and installation and sheathing of floor, wall and ceiling components</li> <li>squaring and applying sub-floor materials</li> <li>framing walls and ceiling</li> </ul> </li> <li>demonstrate proper lifting techniques</li> <li>use proper personal protective equipment</li> <li>demonstrate appropriate temporary bracing techniques</li> <li>demonstrate proper care and use of hand and power assisted tools</li> <li>secure all floor, wall and ceiling openings.</li> </ul>	<p>Stress the importance of following appropriate squaring and plumbing techniques.</p> <p>Check condition of ladders and ensure safe angle ratios.</p>
<b>Assessment</b> <ul style="list-style-type: none"> <li>Quality Control</li> <li>Career Information</li> <li>Career Preparation</li> </ul>	<ul style="list-style-type: none"> <li>check alignment of crowns and bridging systems as well as the application of fasteners and adhesives</li> <li>identify further training and career opportunities related to the manufacture and installation of conventional and engineered components</li> <li>maintain a record of completed activities within a portfolio.</li> </ul>	



# CONSTRUCTION TECHNOLOGIES

## SECTION G: ASSESSMENT TOOLS

The following pages comprise background information and strategies for assessing student achievement and the assessment tools that are listed in Sections D, E and F of this Guide.

This section of the Guide to Standards and Implementation has been designed to provide a common base of understanding about the level of competencies students are expected to demonstrate to successfully complete a module. The goal is to establish assessment standards for junior and senior high school students that are fair, credible and challenging.

These tools will assist teachers throughout the province to more consistently assess student achievement. The purpose of expanding on the assessment standards is to:

- increase confidence among students, parents, business/industry and post-secondary that students can demonstrate the competencies specified in the modules they have completed
- encourage fairness and equity in how students' efforts are judged
- enable learners to focus effort on key learnings
- support teachers and community partners in planning and implementing CTS.

These tools were validated during the optional stage of CTS implementation.



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## ASSESSING STUDENT ACHIEVEMENT IN CTS

The CTS assessment standards assess two basic forms of competency:

- What can a student *do*?
  - **make** a product (e.g., wood bowl, report, garment)
  - **demonstrate** a process
    - strand-related competencies (e.g., keyboarding, hair cutting, sewing techniques, lab procedures)
    - basic competencies (e.g., resource use, safety procedures, teamwork).
- What does a student *know*?
  - knowledge base needed to demonstrate a competency (link theory and practice).

### CTS Defines *Summative* Assessment Standards

The assessment standards and tools defined for the CTS modules, referenced in Sections D, E and F of this Guide, focus on the final (or summative) assessment of student achievement.

Assessment throughout the learning period (formative assessment) will continue to assess how students are progressing. Teachers direct and respond to students' efforts to learn—setting and marking tasks and assignments, indicating where improvement is needed, sending out interim reports, congratulating excellence, etc.

Teachers will decide which instructional and assessment strategies to apply during the formative learning period. As formative and summative assessment are closely linked, some teachers may wish to modify the tools included in this section to use during the instructional process. Teachers may also develop their own summative assessment tools as long as the standards are consistent with the minimum expectations outlined by Alberta Education.

## Grading and Reporting Student Achievement

When a student can demonstrate ALL of the exit-level competencies defined for the module (module learner expectations), the teacher will designate the module as “successfully completed.” The teacher will then use accepted grading practices to determine the percentage grade to be given for the module—a mark not less than 50%.

The time frame a teacher allows a student to develop the exit-level competency is a local decision. NOTE: The Senior High School Handbook specifies that students must have access to 25 hours of instruction for each credit. Students may, however, attain the required competencies in less time and may proceed to other modules.

Teachers are encouraged to consult their colleagues to ensure grading practices are as consistent as possible.

High school teachers may wish to refer to “Directions for Reporting Student Achievement in CTS” for information on how to use the CTS course codes to report the credits that students have earned to Alberta Education. (Copies of this document have been forwarded to superintendents and senior high school principals.)

### Components of Assessment Standards in CTS

The following components are included in each module:

- **module learner expectations** (in the shaded left column of the module) define the exit-level competencies students are expected to achieve to complete a module. Each MLE defines and describes critical behaviours that can be measured and observed. The student must meet the standard specified for **ALL** MLEs within a module to be successful.



- **suggested emphasis** (right column of the module) provides a guideline for the relative significance of each MLE and can be used to organize for instruction.
- **criteria and conditions** (middle column of the module) set the framework for the assessment of student competency, specifying the minimum standard for performance and including a reference to assessment tools, where appropriate.

*Criteria* define the behaviours that a student must demonstrate to meet the designated standard. For example, the criteria could describe the various techniques that must be demonstrated when using a tool, and/or describe the minimum components of a project the student must complete.

*Conditions* outline the specifications under which a student's competency can be judged. For example, the conditions could specify whether the assessment should be timed or not, or if the student should be allowed to access to support resources or references.

*Standard* may be defined by (1) assessment tools, which are referenced in this section (or sometimes in approved learning resources) and/or (2) "illustrative examples" of student work, if appropriate.

*Assessment Tools* included in this section of the Guide tend to be of two types:

- tools generic to a strand or to the entire CTS program; e.g., a standard 5-point rating scale is used in all strands. Other generic tools include assessing reports and presentations and lab safety checklists. (*Names of these tools include the strand code [e.g., "INF" for Information Processing] and a code for the type of tool [e.g., "TDENT" for Text-Data Entry].*)

- tools specific to a module; e.g., assessment checklist for assessing a venture plan in Enterprise and Innovation or a checklist for sketching, drawing and modelling in Design Studies. (*Names of these tools include the module code; e.g., "INF1010-1" indicating that it is the first module-specific tool used in Information Processing Module 1010.*)

## Development and Validation Processes

The "Criteria and Condition" and "Suggested Emphasis" columns have been validated, with extensive input from teachers, professional associations/contacts and post-secondary institutions. The goal is to prepare well-structured assessment standards and related assessment tools that:

- establish an appropriate level of challenge and rigour
- relate directly to the type of learning described in the curriculum standard
- are easy to understand
- are efficient to implement
- can provide a consistent measure of what was expected to be measured.

As students and teachers work with the assessment standards and tools, it is expected that levels of performance will increase as more and more students are able to achieve the minimum standard. Therefore, the assessment standards and related tools will continue to be monitored, and revised as necessary to ensure appropriate levels or rigour and challenge, and successful transitions for students as they leave high school and enter the workplace or related post-secondary programs.



## ASSESSING STUDENT ACHIEVEMENT IN CONSTRUCTION TECHNOLOGIES

Much of the assessment in Construction Technologies consists of gathering information about what a student knows and is able to do, and being able to compare those outcomes with the standards identified within the curriculum.

Assessing student performance in Construction Technologies values process as well as product. Its focus is primarily on measuring and reporting on how well a student applies knowledge and skills to complete a given task rather than the simple acquisition of knowledge and skills.

### Assessment Strategies and Tools

A variety of tools have been provided for your reference and use. In the development of the assessment materials there has been an attempt to keep it as simple as possible while also providing guidance and assistance to the teacher. The tools are intended to help you assess students' work as accurately and consistently as possible by stating standards of performance for elements felt to be important within the curriculum as a whole or in specific modules. They also provide standards for "basic competencies" students should be able to demonstrate while engaged in learning.

The tools that have been developed are intended to be used as summative assessment tools. Depending on the way the classroom is organized, they may be used when the student has indicated he or she is ready for the final assessment or by the entire class at the end of the learning period.

### Tools Generic to Construction Technologies

Throughout the Construction Technologies strand, students are engaged in activities and projects that involve the application of knowledge and use of a variety of skills and techniques. Frameworks for assessing student activities and project work have been developed for each of the introductory, intermediate and advanced levels. These frameworks are identified as *CONACT* and *CONPRO*, respectively.

In addition to "Equipment Checklists" that identify proper set-up, operating and shut-down procedures for specific tools, a "Response Rating Scale" has been developed to help assess the application of knowledge and related content.

### Tools Specific to Construction Technologies

The tools that have been developed to assess specific MLEs in a module are labelled with the module number and the tool number; e.g. CON1070-1. They are referred to under the conditions and criteria section for each module.

The assessment tools outline the criteria for assessment and the minimum task performance rating using a five-point scale. These standards establish an appropriate level of performance and achievement for one or more module learner expectations.

A number of module-specific assessment tools have been developed around the frameworks generic to CTS and the strand. These tools identify basic as well as strand-specific skill sets such as:

- Planning and Management
- Information Gathering and Processing
- Presenting/Reporting
- Use of Equipment and Materials
- Construction Techniques.

Where appropriate, "Illustrative Examples" have also been developed to help establish realistic expectations and standards of achievement.

Career exploration is integrated throughout the Construction Technologies strand and is assessed using dedicated tools or as a component of a tool.

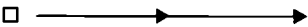

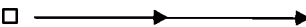


## BASIC COMPETENCIES REFERENCE GUIDE










The chart below outlines basic competencies that students endeavour to develop and enhance in each of the CTS strands and modules. Students' basic competencies should be assessed through observations involving the student, teacher(s), peers and others as they complete the requirements for each module. In general, there is a progression of task complexity and student initiative as outlined in the Developmental Framework\*. As students progress through Stages 1, 2, 3 and 4 of this reference guide, they build on the competencies gained in earlier stages. Students leaving high school should set themselves a goal of being able to demonstrate Stage 3 performance.

*Suggested strategies for classroom use include:*

- having students rate themselves and each other
- using in reflective conversation between teacher and student
- highlighting areas of strength
- tracking growth in various CTS strands
- highlighting areas upon which to focus
- maintaining a student portfolio.

Stage 1— The student:	Stage 2— The student:	Stage 3— The student:	Stage 4— The student:
<b>Managing Learning</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> comes to class prepared for learning</li> <li><input type="checkbox"/> follows basic instructions, as directed</li> <li><input type="checkbox"/> acquires specialized knowledge, skills and attitudes</li> <li><input type="checkbox"/> identifies criteria for evaluating choices and making decisions</li> <li><input type="checkbox"/> uses a variety of learning strategies</li> </ul>	 <ul style="list-style-type: none"> <li><input type="checkbox"/> follows instructions, with limited direction</li> <li><input type="checkbox"/> sets goals and establishes steps to achieve them, with direction</li> <li><input type="checkbox"/> applies specialized knowledge, skills and attitudes in practical situations</li> <li><input type="checkbox"/> identifies and applies a range of effective strategies for solving problems and making decisions</li> <li><input type="checkbox"/> explores and uses a variety of learning strategies, with limited direction</li> </ul>	 <ul style="list-style-type: none"> <li><input type="checkbox"/> follows detailed instructions on an independent basis</li> <li><input type="checkbox"/> sets clear goals and establishes steps to achieve them</li> <li><input type="checkbox"/> transfers and applies specialized knowledge, skills and attitudes in a variety of situations</li> <li><input type="checkbox"/> uses a range of critical thinking skills to evaluate situations, solve problems and make decisions</li> <li><input type="checkbox"/> selects and uses effective learning strategies</li> <li><input type="checkbox"/> cooperates with others in the effective use of learning strategies</li> </ul>	 <ul style="list-style-type: none"> <li><input type="checkbox"/> demonstrates self-direction in learning, goal setting and goal achievement</li> <li><input type="checkbox"/> transfers and applies learning in new situations; demonstrates commitment to lifelong learning</li> <li><input type="checkbox"/> thinks critically and acts logically to evaluate situations, solve problems and make decisions</li> <li><input type="checkbox"/> provides leadership in the effective use of learning strategies</li> </ul>
<b>Managing Resources</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> adheres to established timelines; uses time/schedules/planners effectively</li> <li><input type="checkbox"/> uses information (material and human resources), as directed</li> <li><input type="checkbox"/> uses technology (facilities, equipment, supplies), as directed, to perform a task or provide a service</li> <li><input type="checkbox"/> maintains, stores and/or disposes of equipment and materials, as directed</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> creates and adheres to timelines, with limited direction; uses time/schedules/planners effectively</li> <li><input type="checkbox"/> accesses and uses a range of relevant information (material and human resources), with limited direction</li> <li><input type="checkbox"/> uses technology (facilities, equipment, supplies), as appropriate, to perform a task or provide a service, with minimal assistance and supervision</li> <li><input type="checkbox"/> maintains, stores and/or disposes of equipment and materials, with limited assistance</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> creates and adheres to detailed timelines on an independent basis; prioritizes task; uses time/schedules/planners effectively</li> <li><input type="checkbox"/> accesses a range of information (material and human resources), and recognizes when additional resources are required</li> <li><input type="checkbox"/> selects and uses appropriate technology (facilities, equipment, supplies) to perform a task or provide a service on an independent basis</li> <li><input type="checkbox"/> maintains, stores and/or disposes of equipment and materials on an independent basis</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> creates and adheres to detailed timelines; uses time/schedules/planners effectively; prioritizes tasks on a consistent basis</li> <li><input type="checkbox"/> uses a wide range of information (material and human resources) in order to support and enhance the basic requirement</li> <li><input type="checkbox"/> recognizes the monetary and intrinsic value of managing technology (facilities, equipment, supplies)</li> <li><input type="checkbox"/> demonstrates effective techniques for managing facilities, equipment and supplies</li> </ul>
<b>Problem Solving and Innovation</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> participates in problem solving as a process</li> <li><input type="checkbox"/> learns a range of problem-solving skills and approaches</li> <li><input type="checkbox"/> practices problem-solving skills by responding appropriately to a clearly defined problem, specified goals and constraints, by: <ul style="list-style-type: none"> <li>– generating alternatives</li> <li>– evaluating alternatives</li> <li>– selecting appropriate alternative(s)</li> <li>– taking action</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> identifies the problem and selects an appropriate problem-solving approach, responding appropriately to specified goals and constraints</li> <li><input type="checkbox"/> applies problem-solving skills to a directed or a self-directed activity, by: <ul style="list-style-type: none"> <li>– generating alternatives</li> <li>– evaluating alternatives</li> <li>– selecting appropriate alternative(s)</li> <li>– taking action</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> thinks critically and acts logically in the context of problem solving</li> <li><input type="checkbox"/> transfers problem-solving skills to real-life situations, by generating new possibilities</li> <li><input type="checkbox"/> prepares implementation plans</li> <li><input type="checkbox"/> recognizes risks</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> identifies and resolves problems efficiently and effectively</li> <li><input type="checkbox"/> identifies and suggests new ideas to get the job done creatively, by: <ul style="list-style-type: none"> <li>– combining ideas or information in new ways</li> <li>– making connections among seemingly unrelated ideas</li> <li>– seeking out opportunities in an active manner</li> </ul> </li> </ul>



Stage 1— The student:	Stage 2— The student:	Stage 3— The student:	Stage 4— The student:
<b>Communicating Effectively</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> uses communication skills; e.g., reading, writing, illustrating, speaking</li> <li><input type="checkbox"/> uses language in appropriate context</li> <li><input type="checkbox"/> listens to understand and learn</li> <li><input type="checkbox"/> demonstrates positive interpersonal skills in selected contexts</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> communicates thoughts, feelings and ideas to justify or challenge a position, using written, oral and/or visual means</li> <li><input type="checkbox"/> uses technical language appropriately</li> <li><input type="checkbox"/> listens and responds to understand and learn</li> <li><input type="checkbox"/> demonstrates positive interpersonal skills in many contexts</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> prepares and effectively presents accurate, concise, written, visual and/or oral reports providing reasoned arguments</li> <li><input type="checkbox"/> encourages, persuades, convinces or otherwise motivates individuals</li> <li><input type="checkbox"/> listens and responds to understand, learn and teach</li> <li><input type="checkbox"/> demonstrates positive interpersonal skills in most contexts</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> negotiates effectively, by working toward an agreement that may involve exchanging specific resources or resolving divergent interests</li> <li><input type="checkbox"/> negotiates and works toward a consensus</li> <li><input type="checkbox"/> listens and responds to understand, learn, teach and evaluate</li> <li><input type="checkbox"/> promotes positive interpersonal skills among others</li> </ul>
<b>Working with Others</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> fulfills responsibility in a group project</li> <li><input type="checkbox"/> works collaboratively in structured situations with peer members</li> <li><input type="checkbox"/> acknowledges the opinions and contributions of others in the group</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> </li> <li><input type="checkbox"/> cooperates to achieve group results</li> <li><input type="checkbox"/> maintains a balance between speaking, listening and responding in group discussions</li> <li><input type="checkbox"/> respects the feelings and views of others</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> seeks a team approach, as appropriate, based on group needs and benefits; e.g., idea potential, variety of strengths, sharing of workload</li> <li><input type="checkbox"/> works in a team or group: <ul style="list-style-type: none"> <li>– encourages and supports team members</li> <li>– helps others in a positive manner</li> <li>– provides leadership/ followership as required</li> <li>– negotiates and works toward consensus as required</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> leads, where appropriate, mobilizing the group for high performance</li> <li><input type="checkbox"/> understands and works within the context of the group</li> <li><input type="checkbox"/> prepares, validates and implements plans that reveal new possibilities</li> </ul>
<b>Demonstrating Responsibility</b> <p><b>Attendance</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> demonstrates responsibility in attendance, punctuality and task completion</li> </ul> <p><b>Safety</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> follows personal and environmental health and safety procedures</li> <li><input type="checkbox"/> identifies immediate hazards and their impact on self, others and the environment</li> <li><input type="checkbox"/> follows appropriate/emergency response procedures</li> </ul> <p><b>Ethics</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> makes personal judgements about whether or not certain behaviours/actions are right or wrong</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> </li> <li><input type="checkbox"/> recognizes and follows personal and environmental health and safety procedures</li> <li><input type="checkbox"/> identifies immediate and potential hazards and their impact on self, others and the environment</li> <li><input type="checkbox"/> </li> <li><input type="checkbox"/> assesses how personal judgements affect other peer members and/or family; e.g., home and school</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> </li> <li><input type="checkbox"/> establishes and follows personal and environmental health and safety procedures</li> <li><input type="checkbox"/> </li> <li><input type="checkbox"/> </li> <li><input type="checkbox"/> assesses the implications of personal/group actions within the broader community; e.g., workplace</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> </li> <li><input type="checkbox"/> transfers and applies personal and environmental health and safety procedures to a variety of environments and situations</li> <li><input type="checkbox"/> </li> <li><input type="checkbox"/> </li> <li><input type="checkbox"/> demonstrates accountability for actions taken to address immediate and potential hazards</li> <li><input type="checkbox"/> analyzes the implications of personal/group actions within the global context</li> <li><input type="checkbox"/> states and defends a personal code of ethics as required</li> </ul>
<b>★ Developmental Framework</b> <ul style="list-style-type: none"> <li>• Simple task</li> <li>• Structured environment</li> <li>• Directed learning</li> </ul>	<ul style="list-style-type: none"> <li>• Task with limited variables</li> <li>• Less structured environment</li> <li>• Limited direction</li> </ul>	<ul style="list-style-type: none"> <li>• Task with multiple variables</li> <li>• Flexible environment</li> <li>• Self-directed learning, seeking assistance as required</li> </ul>	<ul style="list-style-type: none"> <li>• Complex task</li> <li>• Open environment</li> <li>• Self-directed/self-motivated</li> </ul>



# GENERIC RATING SCALE

S C A L E	RUBRIC STATEMENT (included in assessment tool/statements in <i>italics</i> are optional)	IS TASK/ PROJECT COMPLETED?	PROBLEM SOLVING: STUDENT INITIATIVE VS TEACHER DIRECTION/ SUPPORT	USE OF TOOLS, MATERIALS, PROCESSES	STANDARDS OF QUALITY/ PRODUCTIVITY	TEAMWORK LEADERSHIP	SERVICE CLIENT/ CUSTOMER
4	<i>The student:</i> exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. <i>Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals. Analyzes and provides effective client/customer services beyond expectations.</i>	Exceeds defined outcomes.	Plans and solves problems effectively and creatively in a self-directed manner.	Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.	<i>Quality, particularly details and finishes, and productivity are consistent and exceed standards.</i>	<i>Leads others to contribute team goals.</i>	<i>Analyzes and provides effective client/customer services beyond expectations.</i>
3	meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. <i>Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort. Analyzes and provides effective client/customer services.</i>	Meets defined outcomes.	Plans and solves problems in a self-directed manner.	Tools, materials and/or processes are selected and used efficiently and effectively.	<i>Quality and productivity are consistent.</i>	<i>Works cooperatively and contributes ideas and suggestions that enhance team effort.</i>	<i>Analyzes and provides effective client/customer services.</i>
2	meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. <i>Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals. Identifies and provides customer/client services.</i>	Meets defined outcomes.	Plans and solves problems with limited assistance.	Tools, materials and/or processes are selected and used appropriately.	<i>Quality and productivity are reasonably consistent.</i>	<i>Works cooperatively to achieve team goals.</i>	<i>Identifies and provides customer/client services.</i>
1	meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. <i>Quality and productivity are reasonably consistent. Works cooperatively. Provides a limited range of customer/client services.</i>	Meets defined outcomes.	Follows a guided plan of action.	A limited range of tools, materials and/or processes are used appropriately.	<i>Quality and productivity are reasonably consistent.</i>	<i>Works cooperatively.</i>	<i>Provides a limited range of customer/client services.</i>
0	has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.	Has not completed defined outcomes.		Tools, materials and/or processes are used inappropriately.			

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## ASSESSMENT FRAMEWORK: ISSUE ANALYSIS

CTSISS

INTRODUCTORY	INTERMEDIATE	ADVANCED
<p><i>The student:</i></p> <p><b>Preparation and Planning</b></p> <ul style="list-style-type: none"> <li>accurately describes an issue on which people disagree</li> <li>poses an important question regarding the issue</li> <li>accesses basic in-school/community information sources regarding the issue</li> <li>uses one or more information-gathering techniques</li> </ul> <p><b>Analyzing Perspectives</b></p> <ul style="list-style-type: none"> <li>clarifies different points of view regarding the issue; <i>e.g., social, economic, environmental</i></li> <li>states a position on the issue and logical reasons for adopting that position</li> <li>states an opposing position on the issue and logical reasons for adopting that position</li> <li>identifies sources of conflict among different positions</li> <li>distinguishes between fact and fiction/opinion/theory</li> </ul> <p><b>Collaboration and Teamwork</b></p> <ul style="list-style-type: none"> <li>shares work appropriately among group members</li> <li>respects the views of others</li> </ul> <p><b>Evaluating Choices/Making Decisions</b></p> <ul style="list-style-type: none"> <li>identifies useful alternatives regarding the issue</li> <li>establishes criteria for assessing each alternative; <i>e.g., social, economic, environmental</i></li> <li>selects an appropriate alternative based on established criteria</li> <li>reflects on strengths/weaknesses of decisions by considering consequences</li> <li>communicates information in a logical sequence to justify choices/decisions made</li> </ul>	<p><i>The student:</i></p> <p><b>Preparation and Planning</b></p> <ul style="list-style-type: none"> <li>accurately describes an issue on which people disagree, explaining areas of disagreement</li> <li>poses one or more thoughtful questions regarding the issue</li> <li>accesses a range of relevant in-school/community resources</li> <li>uses a range of information-gathering techniques</li> </ul> <p><b>Analyzing Perspectives</b></p> <ul style="list-style-type: none"> <li>categorizes different points of view regarding the issue; <i>e.g., cultural, ethical, economic, environmental, health-related</i></li> <li>states a position on the issue and logical reasons for adopting that position</li> <li>states two or more opposing positions on the issue and logical reasons for adopting each position</li> <li>describes interrelationships among different perspectives/points of view</li> <li>determines accuracy/currency/reliability of information and ideas</li> </ul> <p><b>Collaboration and Teamwork</b></p> <ul style="list-style-type: none"> <li>shares work appropriately among group members</li> <li>respects and considers the views of others</li> <li>negotiates solutions to problems</li> </ul> <p><b>Evaluating Choices/Making Decisions</b></p> <ul style="list-style-type: none"> <li>identifies important and appropriate alternatives regarding the issue</li> <li>establishes knowledge- and value-based criteria for assessing each alternative; <i>e.g., social, economic, environmental</i></li> <li>selects an appropriate alternative by showing differences among choices</li> <li>assesses strengths/weaknesses of decisions by considering consequences</li> <li>communicates ideas in a logical sequence with supporting detail to justify choices/decisions made</li> </ul>	<p><i>The student:</i></p> <p><b>Preparation and Planning</b></p> <ul style="list-style-type: none"> <li>accurately describes an issue on which people disagree, explaining specific causes of disagreement</li> <li>poses thoughtful questions regarding the issue</li> <li>accesses a range of relevant information sources and recognizes when additional information is required</li> <li>demonstrates resourcefulness in collecting data</li> </ul> <p><b>Analyzing Perspectives</b></p> <ul style="list-style-type: none"> <li>categorizes different points of view regarding the issue; <i>e.g., cultural, ethical, economic, environmental, health-related, scientific, political</i></li> <li>states a position on the issue and insightful reasons for adopting that position</li> <li>states three or more opposing positions on the issue and thoughtful reasons for adopting each position</li> <li>analyzes interrelationships among different perspectives/points of view</li> <li>recognizes underlying bias/assumptions/values in information and ideas</li> </ul> <p><b>Collaboration and Teamwork</b></p> <ul style="list-style-type: none"> <li>shares work appropriately among group members</li> <li>respects and considers the views of others</li> <li>negotiates with sensitivity solutions to problems</li> </ul> <p><b>Evaluating Choices/Making Decisions</b></p> <ul style="list-style-type: none"> <li>describes in detail important and appropriate alternatives regarding the issue</li> <li>establishes knowledge- and value-based criteria for assessing each alternative; <i>e.g., social, economic, environmental</i></li> <li>selects an appropriate and useful alternative by showing differences among choices</li> <li>assesses strengths/weaknesses of decisions by considering consequences and implications</li> <li>communicates thoughts/feelings/ideas clearly to justify choices/decisions made</li> </ul>



# ASSESSMENT FRAMEWORK: LAB INVESTIGATIONS

CTSLAB

INTRODUCTORY	INTERMEDIATE	ADVANCED
<p><i>The student:</i></p> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• prepares self for task</li> <li>• organizes and works in an orderly manner</li> <li>• carries out instructions accurately</li> <li>• uses time effectively</li> </ul> <p><b>Teamwork</b></p> <ul style="list-style-type: none"> <li>• cooperates with group members</li> <li>• shares work appropriately among group members</li> </ul> <p><b>Use of Equipment and Materials</b></p> <ul style="list-style-type: none"> <li>• selects and uses appropriate equipment/materials</li> <li>• follows safe procedures/techniques</li> <li>• weighs and measures accurately</li> <li>• returns clean equipment/materials to storage areas</li> </ul> <p><b>Investigative Techniques</b></p> <ul style="list-style-type: none"> <li>• gathers and applies information from at least one source</li> <li>• makes predictions that can be tested</li> <li>• sets up and conducts experiments to test a prediction</li> <li>• distinguishes between manipulated/responding variables</li> <li>• obtains results that can be used to determine if some aspect of the prediction is accurate</li> <li>• summarizes important experimental outcomes</li> </ul>	<p><i>The student:</i></p> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• prepares self for task</li> <li>• organizes and works in an orderly manner</li> <li>• interprets and carries out instructions accurately</li> <li>• plans and uses time effectively</li> <li>• adheres to routine procedures</li> </ul> <p><b>Teamwork</b></p> <ul style="list-style-type: none"> <li>• cooperates with group members</li> <li>• shares work appropriately among group members</li> <li>• negotiates solutions to problems</li> </ul> <p><b>Use of Equipment and Materials</b></p> <ul style="list-style-type: none"> <li>• selects and uses appropriate equipment/materials</li> <li>• models safe procedures/techniques</li> <li>• weighs and measures accurately</li> <li>• practises proper sanitation procedures</li> <li>• minimizes waste of materials</li> <li>• advises of potential hazards and necessary repairs</li> </ul> <p><b>Investigative Techniques</b></p> <ul style="list-style-type: none"> <li>• gathers and applies information from a variety of sources</li> <li>• makes predictions that can be tested</li> <li>• plans, sets up and conducts experiments to test a prediction</li> <li>• identifies and explains manipulated/responding variables</li> <li>• obtains accurate results that confirm/reject the prediction</li> <li>• summarizes and applies experimental outcomes</li> </ul>	<p><i>The student:</i></p> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• prepares self for task</li> <li>• organizes and works in an orderly manner</li> <li>• interprets and carries out instructions accurately</li> <li>• plans and uses time effectively in a logical sequence</li> <li>• displays leadership in adhering to routine procedures</li> <li>• attempts to solve problems prior to requesting help</li> </ul> <p><b>Teamwork</b></p> <ul style="list-style-type: none"> <li>• cooperates with group members</li> <li>• shares work appropriately among group members</li> <li>• negotiates with sensitivity solutions to problems</li> <li>• displays effective communication skills</li> </ul> <p><b>Use of Equipment and Materials</b></p> <ul style="list-style-type: none"> <li>• selects and uses equipment/materials independently</li> <li>• demonstrates concern for safe procedures/techniques</li> <li>• weighs and measures accurately and efficiently</li> <li>• practises proper sanitation procedures</li> <li>• minimizes waste of materials</li> <li>• anticipates potential hazards and emergency response</li> </ul> <p><b>Investigative Techniques</b></p> <ul style="list-style-type: none"> <li>• uses relevant information to explain observations</li> <li>• makes predictions that can be tested</li> <li>• plans, sets up and conducts experiments to test a prediction</li> <li>• analyzes relationships among manipulated/responding variables</li> <li>• obtains accurate results that confirm/reject prediction and answer related questions</li> <li>• summarizes, applies and evaluates experimental outcomes</li> </ul>



# ASSESSMENT FRAMEWORK: NEGOTIATION AND DEBATE

CTSNEG

INTRODUCTORY	INTERMEDIATE	ADVANCED
<p><i>The student:</i></p> <p><b>Preparation and Planning</b></p> <ul style="list-style-type: none"> <li>• accurately describes an issue on which people disagree</li> <li>• poses an important question regarding the issue</li> <li>• accesses basic in-school/community information sources regarding the issue</li> <li>• uses one or more information-gathering techniques</li> </ul> <p><b>Analyzing Perspectives</b></p> <ul style="list-style-type: none"> <li>• states a position on the issue and logical reasons for adopting that position</li> <li>• explains why the issue is important by presenting examples of possible consequences</li> <li>• clarifies different points of view regarding the issue; <i>e.g., social, economic, environmental</i></li> <li>• distinguishes between fact and fiction/opinion/theory</li> </ul> <p><b>Collaboration and Teamwork</b></p> <ul style="list-style-type: none"> <li>• works with a range of peer members</li> <li>• shares information/opinions/suggestions through group discussion</li> <li>• listens to and respects the views of others</li> </ul> <p><b>Negotiating and Debating</b></p> <ul style="list-style-type: none"> <li>• presents a convincing argument in logical sequence supporting a position adopted on the issue</li> <li>• provides a relevant response to opposing arguments</li> <li>• speaks clearly so the argument can be understood</li> <li>• establishes a shared understanding of key alternatives and consequences relevant to the issue</li> </ul>	<p><i>The student:</i></p> <p><b>Preparation and Planning</b></p> <ul style="list-style-type: none"> <li>• accurately describes an issue on which people disagree, explaining areas of disagreement</li> <li>• poses one or more thoughtful questions regarding the issue</li> <li>• accesses a range of relevant in-school/community resources</li> <li>• uses a range of information-gathering techniques</li> </ul> <p><b>Analyzing Perspectives</b></p> <ul style="list-style-type: none"> <li>• states a position on the issue and logical reasons for adopting that position</li> <li>• explains why the issue is important by presenting examples of possible consequences</li> <li>• categorizes different points of view regarding the issue; <i>e.g., cultural, ethical, economic, environmental, health-related</i></li> <li>• determines accuracy/currency/reliability of information and ideas</li> </ul> <p><b>Collaboration and Teamwork</b></p> <ul style="list-style-type: none"> <li>• works with a range of peer members</li> <li>• shares information/opinions/suggestions, maintaining a balance between speaking and listening</li> <li>• listens to and respects the views of others, requesting clarification as necessary from other group members</li> </ul> <p><b>Negotiating and Debating</b></p> <ul style="list-style-type: none"> <li>• presents a convincing argument in logical sequence supporting a position adopted, conveying points in order of importance</li> <li>• provides a relevant and convincing response to opposing arguments</li> <li>• speaks clearly without hesitation so the argument can be understood</li> <li>• negotiates a shared agreement on preferred alternatives relevant to the issue</li> </ul>	<p><i>The student:</i></p> <p><b>Preparation and Planning</b></p> <ul style="list-style-type: none"> <li>• accurately describes an issue on which people disagree, explaining specific causes of disagreement</li> <li>• poses thoughtful questions regarding the issue</li> <li>• accesses a range of relevant information sources and recognizes when additional information is required</li> <li>• demonstrates resourcefulness in collecting data</li> </ul> <p><b>Analyzing Perspectives</b></p> <ul style="list-style-type: none"> <li>• states a position on the issue and insightful reasons for adopting that position</li> <li>• explains why the issue is important by presenting examples of possible consequences and implications</li> <li>• categorizes different points of view regarding the issue; <i>e.g., cultural, ethical, economic, environmental, health-related, scientific, political</i></li> <li>• recognizes underlying bias/assumptions/values in information and ideas</li> </ul> <p><b>Collaboration and Teamwork</b></p> <ul style="list-style-type: none"> <li>• works with a wide range of peer members</li> <li>• shares information/opinions/suggestions, maintaining a balance between speaking and listening</li> <li>• listens to and respects the views of others, requesting clarification as necessary from other group members</li> </ul> <p><b>Negotiating and Debating</b></p> <ul style="list-style-type: none"> <li>• presents a convincing argument in logical sequence supporting a position adopted, conveying points in order of importance and backing each with sound evidence</li> <li>• provides a relevant and convincing rebuttal to opposing arguments</li> <li>• speaks clearly without hesitation so the argument can be understood by all listeners</li> <li>• negotiates a shared agreement on preferred alternatives by resolving divergent points of view</li> </ul>



## ASSESSMENT FRAMEWORK: PRESENTATIONS/REPORTS

CTSPRE

INTRODUCTORY	INTERMEDIATE	ADVANCED
<p><i>The student:</i></p> <p><b>Preparation and Planning</b></p> <ul style="list-style-type: none"> <li>• sets goals and follows instructions accurately</li> <li>• responds to directed questions and follows necessary steps to find answers</li> <li>• accesses basic in-school/community information sources</li> <li>• interprets and organizes information into a logical sequence</li> <li>• records information accurately, using correct technical terms</li> <li>• uses time effectively</li> </ul> <p><b>Presentation</b></p> <ul style="list-style-type: none"> <li>• demonstrates effective use of at least one medium of communication: <i>e.g., <u>Written:</u> spelling, punctuation, grammar, basic format</i></li> <li><i>Oral:</i> voice projection, body language</li> <li><i>Audio-Visual:</i> techniques, tools</li> <li>• uses correct grammatical convention and technical terms through proofreading/editing</li> <li>• provides an introduction that describes the purpose of the project</li> <li>• communicates information in a logical sequence</li> <li>• states a conclusion based on a summary of facts</li> <li>• provides a reference list of three or more basic information sources</li> </ul>	<p><i>The student:</i></p> <p><b>Preparation and Planning</b></p> <ul style="list-style-type: none"> <li>• sets goals and describes steps to achieve them</li> <li>• uses personal initiative to formulate questions and find answers</li> <li>• accesses a range of relevant in-school/community resources</li> <li>• interprets, organizes and combines information into a logical sequence</li> <li>• records information accurately with appropriate supporting detail and using correct technical terms</li> <li>• plans and uses time effectively</li> <li>• gathers and responds to feedback regarding approach to task and project status</li> </ul> <p><b>Presentation</b></p> <ul style="list-style-type: none"> <li>• demonstrates effective use of at least two communication media: <i>e.g., <u>Written:</u> spelling, punctuation, grammar, format (formal/informal)</i></li> <li><i>Oral:</i> voice projection, body language, appearance</li> <li><i>Audio-Visual:</i> techniques, tools, clarity</li> <li>• maintains acceptable grammatical and technical standards through proofreading and editing</li> <li>• provides an introduction that describes the purpose and scope of the project</li> <li>• communicates ideas into a logical sequence with sufficient supporting detail</li> <li>• states a conclusion by synthesizing the information gathered</li> <li>• provides a reference list that includes five or more relevant information sources</li> </ul>	<p><i>The student:</i></p> <p><b>Preparation and Planning</b></p> <ul style="list-style-type: none"> <li>• sets goals and describes steps to achieve them</li> <li>• uses personal initiative to formulate questions and find answers</li> <li>• accesses a range of relevant information sources and recognizes when additional information is required</li> <li>• interprets, organizes and combines information in creative and thoughtful ways</li> <li>• records information accurately, using appropriate technical terms and supporting detail</li> <li>• plans and uses time effectively, prioritizing tasks on a consistent basis</li> <li>• assesses and refines approach to task and project status based on feedback and reflection</li> </ul> <p><b>Presentation</b></p> <ul style="list-style-type: none"> <li>• demonstrates effective use of a variety of communication media: <i>e.g., <u>Written:</u> spelling, punctuation, grammar, format (formal/informal, technical/literary)</i></li> <li><i>Oral:</i> voice projection, body language, appearance, enthusiasm, evidence of prior practice</li> <li><i>Audio-Visual:</i> techniques, tools, clarity, speed and pacing</li> <li>• maintains acceptable grammatical and technical standards through proofreading and editing</li> <li>• provides an introduction that describes the purpose and scope of the project</li> <li>• communicates thoughts/feelings/ideas clearly to justify or challenge a position</li> <li>• states a conclusion by analyzing and synthesizing the information gathered</li> <li>• gives evidence of adequate research through a reference list including seven or more relevant information sources</li> </ul>



# ASSESSMENT FRAMEWORK: RESEARCH PROCESS

CTSRES

INTRODUCTORY	INTERMEDIATE	ADVANCED
<p><i>The student:</i></p> <p><b>Preparation and Planning</b></p> <ul style="list-style-type: none"> <li>• sets goals and follows instructions accurately</li> <li>• adheres to established timelines</li> <li>• responds to directed questions and follows necessary steps to find answers</li> <li>• uses time effectively</li> </ul> <p><b>Information Gathering and Processing</b></p> <ul style="list-style-type: none"> <li>• accesses basic in-school/community information sources</li> <li>• uses one or more information-gathering techniques</li> <li>• interprets and organizes information in a logical sequence</li> <li>• records information accurately, using correct technical terms</li> <li>• distinguishes between fact and fiction/opinion/theory</li> <li>• responds to feedback when current approach is not working</li> </ul> <p><b>Collaboration and Teamwork</b></p> <ul style="list-style-type: none"> <li>• cooperates with group members</li> <li>• shares work appropriately among group members</li> </ul> <p><b>Information Sharing</b></p> <ul style="list-style-type: none"> <li>• demonstrates effective use of one or more communication media; <i>e.g., written, oral, audio-visual</i></li> <li>• communicates information in a logical sequence</li> <li>• uses correct grammatical convention and technical terms</li> <li>• cites three or more basic information sources</li> </ul>	<p><i>The student:</i></p> <p><b>Preparation and Planning</b></p> <ul style="list-style-type: none"> <li>• sets goals and establishes steps to achieve them</li> <li>• creates and adheres to useful timelines</li> <li>• uses personal initiative to formulate questions and find answers</li> <li>• plans and uses time effectively</li> </ul> <p><b>Information Gathering and Processing</b></p> <ul style="list-style-type: none"> <li>• accesses a range of relevant in-school/community resources</li> <li>• uses a range of information-gathering techniques</li> <li>• interprets, organizes and combines information into a logical sequence</li> <li>• records information accurately with appropriate supporting detail and using correct technical terms</li> <li>• determines accuracy/currency/reliability of information sources</li> <li>• gathers and responds to feedback regarding approach to the task</li> </ul> <p><b>Collaboration and Teamwork</b></p> <ul style="list-style-type: none"> <li>• cooperates with group members</li> <li>• shares work appropriately among group members</li> <li>• negotiates solutions to problems</li> </ul> <p><b>Information Sharing</b></p> <ul style="list-style-type: none"> <li>• demonstrates effective use of two or more communication media; <i>e.g., written, oral, audio-visual</i></li> <li>• communicates ideas in a logical sequence with sufficient supporting detail</li> <li>• maintains acceptable grammatical and technical standards</li> <li>• cites five or more relevant information sources</li> </ul>	<p><i>The student:</i></p> <p><b>Preparation and Planning</b></p> <ul style="list-style-type: none"> <li>• sets clear goals and establishes steps to achieve them</li> <li>• creates and adheres to detailed timelines</li> <li>• uses personal initiative to formulate questions and find answers</li> <li>• plans and uses time effectively, prioritizing tasks on a consistent basis</li> </ul> <p><b>Information Gathering and Processing</b></p> <ul style="list-style-type: none"> <li>• accesses a range of relevant information sources and recognizes when additional information is required</li> <li>• demonstrates resourcefulness in collecting data</li> <li>• interprets, organizes and combines information in creative and thoughtful ways</li> <li>• records information accurately with appropriate supporting detail and using correct technical terms</li> <li>• recognizes underlying bias/assumptions/values in information sources</li> <li>• assesses and refines approach to the task and project status based on feedback and reflection</li> </ul> <p><b>Collaboration and Teamwork</b></p> <ul style="list-style-type: none"> <li>• cooperates with group members</li> <li>• shares work appropriately among group members</li> <li>• negotiates with sensitivity solutions to problems</li> <li>• displays effective communication and leadership skills</li> </ul> <p><b>Information Sharing</b></p> <ul style="list-style-type: none"> <li>• demonstrates effective use of a variety of communication media; <i>e.g., written, oral, audio-visual</i></li> <li>• communicates thoughts/feelings/ideas clearly to justify or challenge a position</li> <li>• maintains acceptable grammatical and technical standards</li> <li>• gives evidence of adequate information gathering by citing seven or more relevant information sources</li> </ul>



# ASSESSMENT FRAMEWORK: ACTIVITY ASSESSMENT

## CONACT

INTRODUCTORY	INTERMEDIATE	ADVANCED
<p><i>The student:</i></p> <p><b>Planning and Management</b></p> <ul style="list-style-type: none"> <li>• prepares self for task</li> <li>• adheres to routine procedures</li> <li>• follows basic instructions</li> <li>• uses time effectively</li> <li>• asks for help when unsure</li> </ul> <p><b>Construction Techniques</b> (refer to specific module)</p> <p><b>Use of Equipment and Materials</b></p> <ul style="list-style-type: none"> <li>• uses recommended tools and materials safely</li> <li>• wears the proper personal protective equipment</li> <li>• follows proper lifting, handling and storage procedures</li> <li>• calculates and measures accurately</li> <li>• fulfills given clean-up responsibilities</li> <li>• recognizes potential health and safety hazards.</li> </ul> <p><b>Teamwork</b></p> <ul style="list-style-type: none"> <li>• works cooperatively with others in structured settings</li> <li>• shares equipment and supplies</li> </ul>	<p><i>The student:</i></p> <p><b>Planning and Management</b></p> <ul style="list-style-type: none"> <li>• prepares self for task</li> <li>• organizes and works in an orderly manner</li> <li>• interprets and carries out instructions accurately</li> <li>• adheres to established timelines</li> <li>• thinks through the problem before asking for help.</li> </ul> <p><b>Construction Techniques</b> (refer to specific module)</p> <p><b>Use of Equipment and Materials</b></p> <ul style="list-style-type: none"> <li>• selects and uses appropriate equipment/materials safely</li> <li>• uses proper personal protective equipment</li> <li>• observes proper lifting and handling procedures</li> <li>• calculates and measures accurately</li> <li>• minimizes waste of materials</li> <li>• fulfills expected clean-up responsibilities</li> <li>• recognizes and controls potential health and safety hazards.</li> </ul> <p><b>Teamwork</b></p> <ul style="list-style-type: none"> <li>• cooperates with group members in structured and non-structured settings</li> <li>• shares equipment and work appropriately among group members</li> <li>• negotiates solutions to problems.</li> </ul>	<p><i>The student:</i></p> <p><b>Planning and Management</b></p> <ul style="list-style-type: none"> <li>• prepares for task and develops an effective work plan</li> <li>• interprets and carries out instructions accurately</li> <li>• plans and uses time in a logical sequence</li> <li>• displays leadership in adhering to routine procedures</li> <li>• attempts to solve problems prior to requesting help.</li> </ul> <p><b>Construction Techniques</b> (refer to specific module)</p> <p><b>Use of Equipment and Materials</b></p> <ul style="list-style-type: none"> <li>• selects and uses appropriate equipment/materials in a safe and efficient manner</li> <li>• models the correct use of personal protective equipment</li> <li>• makes accurate calculations and measurements</li> <li>• models proper lifting and handling techniques</li> <li>• fulfills clean-up and maintenance responsibilities</li> <li>• identifies and corrects potential health and safety hazards.</li> </ul> <p><b>Teamwork</b></p> <ul style="list-style-type: none"> <li>• collaborates and works cooperatively with group members</li> <li>• shares responsibilities among group members</li> <li>• negotiates with sensitivity solutions to problems</li> <li>• displays effective communication skills.</li> </ul>



# ASSESSMENT FRAMEWORK: PROJECT ASSESSMENT

## CONPRO

INTRODUCTORY	INTERMEDIATE	ADVANCED
<p><i>The student:</i></p> <p><b>Planning and Management</b></p> <ul style="list-style-type: none"> <li>identifies project outcomes</li> <li>gathers information from sources provided</li> <li>generates more than one project idea</li> <li>selects a project with guidance</li> <li>makes modifications to pictorial and/or multiviewed drawings as required using appropriate tools</li> <li>organizes major events from a prepared list of procedures</li> <li>completes a simple material list and cost estimate</li> <li>follows prescribed timelines</li> </ul> <p><b>Construction Techniques</b></p> <ul style="list-style-type: none"> <li>(refer to specific module and/or project specifications).</li> </ul> <p><b>Work Skills</b></p> <ul style="list-style-type: none"> <li>prepares self for task</li> <li>follows basic instructions as directed</li> <li>adheres to prescribed time lines</li> <li>works cooperatively with others in structured settings</li> <li>uses prescribed personal protective equipment</li> <li>follows proper lifting, handling and storage procedures</li> <li>fulfills given clean-up responsibilities.</li> </ul> <p><b>Project Presentation</b></p> <ul style="list-style-type: none"> <li>describes the project and its use</li> <li>summarizes and reports on major events</li> <li>evaluates project planning and construction techniques</li> <li>suggests ways to improve the project.</li> </ul>	<p><i>The student:</i></p> <p><b>Planning and Management</b></p> <ul style="list-style-type: none"> <li>defines project outcomes</li> <li>conducts research pertaining to the selection of a project from a variety of sources</li> <li>generates and considers the suitability of a number of project ideas</li> <li>selects an appropriate solution that meet project outcomes</li> <li>produces and accurately dimensions simple pictorial and multiviewed drawings where necessary using basic tools and software</li> <li>determines the appropriate sequence of events to construction a product in a safe manner</li> <li>revises work plan to accommodate changing requirements</li> <li>estimates the required time to complete a task including planning, set-up and clean-up procedures</li> <li>prepares a list of materials and cost estimate.</li> </ul> <p><b>Construction Techniques</b></p> <ul style="list-style-type: none"> <li>(refer to specific module and/or project specifications).</li> </ul> <p><b>Work Skills:</b></p> <ul style="list-style-type: none"> <li>prepares self for task</li> <li>follows instructions with limited direction</li> <li>adheres to established timelines</li> <li>works cooperatively with others in both structured and non-structured settings</li> <li>uses proper personal protective equipment</li> <li>observes proper lifting, handling and storage procedures</li> <li>fulfills expected clean-up responsibilities.</li> </ul> <p><b>Project Presentation</b></p> <ul style="list-style-type: none"> <li>describes the purpose of the project</li> <li>summarizes and reports on major events</li> <li>evaluates the design and production techniques</li> <li>suggests ways to improve project design and production processes.</li> </ul>	<p><i>The student:</i></p> <p><b>Planning and Management</b></p> <ul style="list-style-type: none"> <li>determines the project outcomes by analyzing client needs</li> <li>locates and conducts research from a variety of sources</li> <li>generates a variety of different solutions and seeks advice from knowledgeable sources</li> <li>selects a solution that has a high potential for success</li> <li>produces accurate pictorial and multiviewed drawings complete with dimensions and notations using advanced tools and software</li> <li>analyzes a product or set of drawings to determine the event sequences</li> <li>is sensitive to a variety of feedback mechanisms and alters plans when the current approach to task is ineffective</li> <li>creates a meaningful timeline based on the complexity of the task</li> <li>prepares a material estimate from a set of working drawings.</li> </ul> <p><b>Construction Techniques</b></p> <ul style="list-style-type: none"> <li>(refer to specific module and/or project specifications).</li> </ul> <p><b>Work Skills</b></p> <ul style="list-style-type: none"> <li>prepares self for task</li> <li>accurately interprets and follows directions</li> <li>creates and adheres to detailed timelines</li> <li>works cooperatively and collaboratively with others</li> <li>uses appropriate personal protective equipment</li> <li>models proper lifting, handling and storage procedures</li> <li>fulfills clean-up and tool maintenance responsibilities</li> </ul> <p><b>Project Presentation</b></p> <ul style="list-style-type: none"> <li>describes the purpose and scope of the project</li> <li>summarizes and reports on major events</li> <li>assesses design processes and production techniques</li> <li>makes recommendations to improve product quality and productivity.</li> </ul>



## PRESENTATIONS/REPORTS: HAND TOOLS

## Basic Tools & Materials: CON1010-1

### Module Learner Expectation

*The student will:*

- identify and describe the safe use of basic hand tools

### Standard

Performance rating of 1 for each applicable task

### Rating Scale

*The student:*

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards.*
- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent.*
- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent.*
- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent.*
- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

### TASK PERFORMANCE CRITERIA

*The student:*

#### Preparation and Planning

- ☐ follows instruction accurately
- ☐ responds to directed questions and follows necessary steps to find answers
- ☐ accesses basic in-school/community information sources
- ☐ organizes information in a logical manner
- ☐ records information accurately using correct technical terms
- ☐ uses time effectively

#### Content

- ☐ develops a chart depicting 20 common hand tools
- ☐ classifies each tool according to the following categories:
  - measurement and layout tools
  - cutting/boring tools
  - assembly/dismantling tools
  - abrading tools
- ☐ describes the purpose and safe use of each tool

#### Presenting/Reporting

- ☐ demonstrates effective use of one or more communication media:  
*e.g., Written: spelling, punctuation, grammar basic format*  
*Oral: voice projection, body language*  
*Audio-visual: techniques, tools*
- ☐ uses correct grammatical convention and technical terms
- ☐ provides an introduction that describes the purpose of the project
- ☐ communicates information in a logical sequence

### PERFORMANCE ASSESSMENT

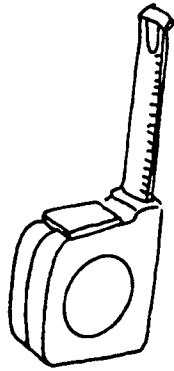
CRITERIA	STUDENT RATING				STANDARD	COMMENTS
Preparation and Planning	4	3	2	1	0	1
Content	4	3	2	1	0	1
Presenting/Reporting	4	3	2	1	0	1



# ILLUSTRATIVE EXAMPLE: HAND TOOL PRESENTATION

## Basic Tools & Materials: CON1010-2

### TOOL



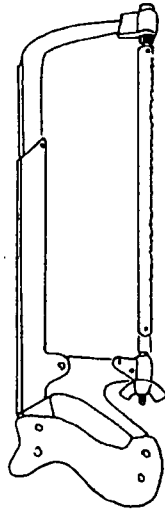
Measuring Tape

### CATEGORY

Measurement and Layout Tool

### DESCRIPTION

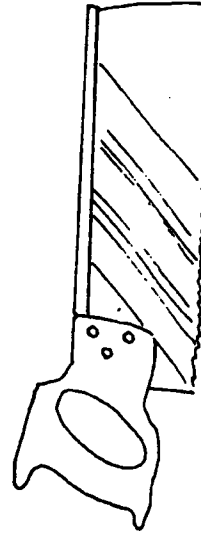
A measuring tape is a spring-loaded steel tape that is carried in a pocket or pouch. It is easy to use and can be purchased in a variety of lengths in both metric and imperial measure. When retracting, care should be taken to avoid contact with the blade.



Hacksaw

Cutting Tool

A hacksaw is used for straight cuts in metal or plastic. The work piece should be held firmly in place at all times. To avoid blade breakage when cutting thin material, the saw should be held so that at least three teeth are in contact with the material at all times.



Backsaw

Cutting Tool

A backsaw is used to make accurate straight cuts in wood. It has a thin blade that is stiffened by a rigid frame along its top edge. A bench hook is often used in conjunction with the saw to provide greater accuracy and safety.

For additional sample items and responses, refer to:

*Design and Technology*. Kathy Browning et. al., 1994. Teacher's Resource.

Assessment Tools

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**PRESENTATIONS/REPORTS: MATERIAL IDENTIFICATION****Basic Tools & Materials: CON1010-3****Module Learner Expectation**

*The student will:*

- identify and compare the properties of common materials used in construction and fabrication activities

**Standard**

Performance rating of 1 for each applicable task

**Rating Scale**

*The student:*

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards.*
- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent.*
- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent.*

- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent.*
- 0 has not completed *defined* outcomes. Tools, materials and/or processes are used inappropriately.

**TASK PERFORMANCE CRITERIA**

<i>The student:</i>	
<b>Preparation and Planning</b> <input type="checkbox"/> follows instructions accurately <input type="checkbox"/> responds to directed questions and follows necessary steps to find answers <input type="checkbox"/> accesses basic in-school/community information sources <input type="checkbox"/> organizes information in a logical manner <input type="checkbox"/> records information accurately using correct technical terms <input type="checkbox"/> uses time effectively	<b>Content (continued)</b> <input type="checkbox"/> provides a sample and description of each material <input type="checkbox"/> identifies a common use for each material  <b>Presenting/Reporting</b> <input type="checkbox"/> demonstrates effective use of one or more communication media: <i>e.g., Written: spelling, punctuation, grammar basic format</i> <i>Oral: voice projection, body language</i> <i>Audio-visual: techniques, tools</i> <input type="checkbox"/> uses correct grammatical conventions and technical terms <input type="checkbox"/> provides an introduction that describes the purpose of the project <input type="checkbox"/> communicates information in a logical manner
<b>Content</b> <input type="checkbox"/> identifies, in chart form, four or more materials in any two of the following categories: – solid and manufactured wood products – ferrous and non-ferrous metals – thermoforming and thermo-setting plastics – clay and concrete products	

**PERFORMANCE ASSESSMENT**

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Preparation and Planning	4	3	2	1	0	1	
Content	4	3	2	1	0	1	
Presenting/ Reporting	4	3	2	1	0	1	



## Module Learner Expectation

The student will:

- identify and describe the main systems found in a residential structure

## Standard

Performance rating of 1 for each applicable task

## Rating Scale

The student:

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards.*
- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent.*
- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent.*

- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent.*
- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

## TASK PERFORMANCE CRITERIA

The student:

### Preparation and Planning

- ☐ follows instructions accurately
- ☐ responds to directed questions and follows necessary steps to find answers
- ☐ accesses basic in-school/community information sources
- ☐ organizes information in a logical manner
- ☐ records information accurately using correct technical terms
- ☐ uses time effectively

### Content

- ☐ briefly describes each of the four systems found in a typical residential structure; e.g.:
  - structural
  - electrical
  - plumbing
  - heating venting and air-conditioning

### Content (continued)

- ☐ elaborates on the:
  - system components
  - common materials
  - related tools
  - nature of the trades related to the system

### Presenting/Reporting

- ☐ demonstrates effective use of one or more communication media:  
e.g., Written: spelling, punctuation, grammar  
basic format  
Oral: voice projection, body language  
Audio-visual: techniques, tools
- ☐ uses correct grammatical conventions and technical terms
- ☐ provides an introduction that describes the purpose of the project
- ☐ communicates information in a logical sequence

## PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Preparation and Planning	4	3	2	1	0	1	
Content	4	3	2	1	0	1	
Presenting/ Reporting	4	3	2	1	0	1	



## Module Learner Expectation

The student will:

- profile a trade or occupation within the building construction industry

## Standard

Performance rating of 1 for each applicable criteria unless otherwise stated

## Rating Scale

The student:

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards.*

- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent.*

- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent.*

- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent.*

- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

## TASK PERFORMANCE CRITERIA

The student:

### Preparation and Planning

- ☐ sets goals and follows instructions accurately
- ☐ adheres to established timelines
- ☐ responds to directed questions and follows necessary steps to find answers
- ☐ uses time effectively

### Content

- ☐ identifies one or more occupation or trade related to the building construction industry
- ☐ lists day-to-day duties of a worker or trades person
- ☐ describes overall working conditions
- ☐ assesses local employment opportunities
- ☐ identifies training programs and entry requirements

### Information Gathering Process

- ☐ accesses basic school/community information sources
- ☐ uses one or more information-gathering techniques
- ☐ interprets and organizes information in a logical sequence

### Information Sharing

- ☐ demonstrates effective use of one or more communication media: *e.g., written, oral, audio-visual*
- ☐ communicates information in a logical sequence
- ☐ uses correct grammatical conventions and technical terms
- ☐ cites three or more basic information sources

## PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Preparation and Planning	4	3	2	1	0	1	
Information Gathering and Processing	4	3	2	1	0	1	
Content	4	3	2	1	0	1	
Information Sharing	4	3	2	1	0	1	

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**Module Learner Expectation**

*The student will:*

- identify and describe the parts of a technological system

**Standard**

Performance rating of 1 for each applicable task

**Rating Scale**

*The student:*

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards.*

- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent.*

- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent.*

- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent.*

- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

**TASK PERFORMANCE CRITERIA**

<i>The student:</i>	
<b>Preparation and Planning</b> <input type="checkbox"/> follows instructions accurately <input type="checkbox"/> responds to directed questions and follows necessary steps to find answers <input type="checkbox"/> accesses basic in-school/community information sources <input type="checkbox"/> organizes information in a logical manner <input type="checkbox"/> records information accurately using correct technical terms <input type="checkbox"/> uses time effectively	<b>Content (continued)</b> <input type="checkbox"/> provides a brief description of each component <input type="checkbox"/> explains the difference between an open and closed system  <b>Presenting/Reporting</b> <input type="checkbox"/> demonstrates effective use of one or more communication media: <i>e.g., <u>Written</u>: spelling, punctuation, grammar basic format</i> <i><u>Oral</u>: voice projection, body language</i> <i><u>Audio-visual</u>: techniques, tools</i> <input type="checkbox"/> uses correct grammatical conventions and technical terms <input type="checkbox"/> provides an introduction that describes the purpose of the project <input type="checkbox"/> communicates information in a logical sequence
<b>Content</b> <input type="checkbox"/> identifies the major parts of a technological system in chart form to include: – input – process – output – feedback mechanisms	

**PERFORMANCE ASSESSMENT**

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Preparation and Planning	4	3	2	1	0	1	
Content	4	3	2	1	0	1	
Presenting/ Reporting	4	3	2	1	0	1	



# ILLUSTRATIVE EXAMPLE: TECHNOLOGICAL SYSTEM

Project Management: CON1120-2

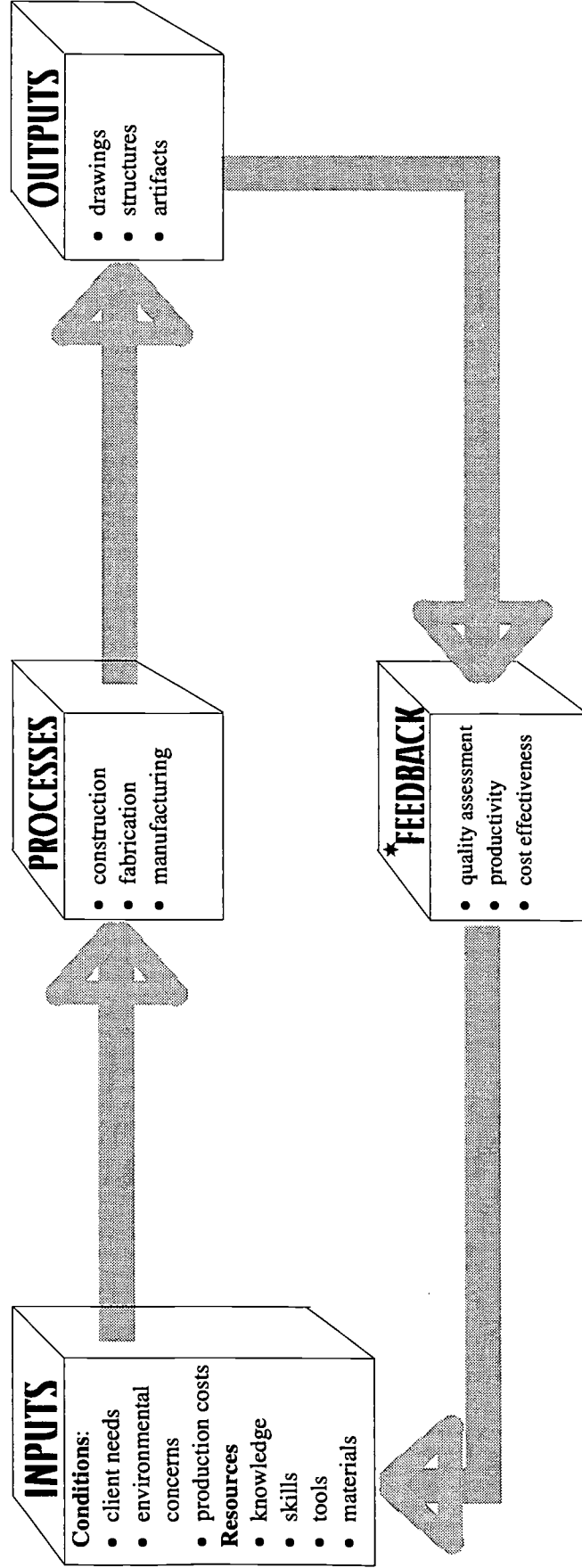
## Presentation

### Task:

- identify the basic parts of a technological system
- provide a description of each component
- explain the difference between an open and closed system

### Student References:

- *Construction Technology* (2<sup>nd</sup> and 3<sup>rd</sup> edition). Mark W. Huth, 1989 & 1996.
- *Living With Technology* (2<sup>nd</sup> edition). Michael Hacker, 1993.



- ★ An open system does not have a feedback mechanism.



**PROJECT ASSESSMENT: PROJECT DEVELOPMENT AND PRESENTATION****Project Management: CON1120-3****Module Learner Expectations***The student will:*

- apply basic drawing skills to prepare a shop drawing
- prepare a project timeline, cost estimate and work schedule
- apply the use of a technological system to construct a simple product with multiple parts

**Standard**

Performance rating of 1 for each applicable criteria

**Rating Scale***The student:*

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards.*
- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent.*
- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent.*
- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent.*
- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

**TASK PERFORMANCE CRITERIA***The student:***Planning and Management (Input)**

- ☐ generates one or more project ideas
- ☐ identifies project with multiple parts
- ☐ produces/modifies simple pictorial and or multiviewed sketch or drawing as required
- ☐ provides accurate dimensions and notes
- ☐ provides accurate material estimate and work schedule

**Construction Techniques (Process)**

- ☐ cuts and secures stock according to plan
- ☐ creates tight-fitting joints
- ☐ appropriately assembles and finishes the product

**Work Skills (Process)**

- ☐ follows instructions as directed
- ☐ adheres to established timeline
- ☐ works cooperatively with others in structured settings
- ☐ uses appropriate tools, materials and processes
- ☐ calculates and measures accurately
- ☐ uses prescribed personal protective equipment
- ☐ handles, stores and/or disposes of materials as instructed

**Project Presentation (Output and Feedback)**

- ☐ describes the project and its intended use
- ☐ summarizes and reports on major production events
- ☐ assesses the design and production processes
- ☐ recommends changes to improve quality, performance and appearance

**PERFORMANCE ASSESSMENT**

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Planning and Management	4	3	2	1	0	1	
Construction Techniques	4	3	2	1	0	1	
Work Skills	4	3	2	1	0	1	
Project Presentation	4	3	2	1	0	1	

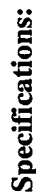
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Assessment Tools  
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(1997)**BEST COPY AVAILABLE**



A simple product such as this sanding block can be used to show students how input, process, output and feedback mechanisms can be used to plan and manage a project.



	Metric	Imperial
A	75 mm	3"
B	100 mm	4"
C	20 mm	3/4"
D	6 mm	1/4"

1. Materials – Pine or other suitable solid wood.
2. Size: this can be adapted for the situation a common size is 20 mm x 75 mm x 100 mm or ¾" x 3" x 4". **TOLERANCE – ± 2mm or ± 1/16".**
3. The cork is cut oversized and is attached with contact cement.
4. Velcro with a stick back is applied over the cork.
5. Sizes of sandpaper (special type with back that is attachable to Velcro) can be cut to the block dimensions.

### Event Sequence:

1. Given a rough piece of lumber, measure and layout the appropriate measurements.
2. Crosscut the material to length.
3. Plan the face side and face edge.
4. Measure and layout the lines for width and thickness.
5. Plane the block down to size. (Measure twice – cut once!!)
6. Mark a 6 mm (1/4") chamfer.
7. Plane a chamfer between layout lines.
8. Cut the cork a little over size and glue to the bottom.
9. Once the glue is dry, trim with a fine set plane.
10. Carefully cut and attach velcro to the cork.
11. Cut a piece of sandpaper and attach it to the velcro.
12. Clean up the block and hand it in for evaluation.

Project developed by Brian Larson, Lacombe Composite High School, Lacombe



## RESPONSE ASSESSMENT: WOOD CHARACTERISTICS

## Solid Stock Construction: CON1130-1

### Module Learner Expectation

*The student will:*

- identify and describe the physical characteristics of a variety of hard and soft woods

### Standard

Response rating of 1

### Rating Scale

*The student:*

- 4 independently makes explanations and critical judgements based on a superior knowledge base and understanding of content and related issues.
- 3 makes explanation and comparisons of content using precise terminology. Requires little or no prompting.
- 2 applies knowledge of content to different situations using accurate terminology. May require some prompting.
- 1 uses simple recall to demonstrate basic knowledge and understanding of content. May require frequent prompting.
- 0 is unable to provide a suitable response at this time.

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### Assessment Tools

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Sample Item(s)	Sample Response(s)
1. All woods have their own unique characteristics. Identify and describe four different woods used in solid stock construction.	<p><u>Pine (Western White Pine):</u> Western pine is a close grained soft wood that has a cream to light brown colour. It works easily with tools and resists splitting.</p> <p><u>Mahogany:</u> Mahogany is a moderately hard wood that varies from a pale to deep reddish brown colour. This wood has excellent working and finishing characteristics even though its open pores require filling before finishing.</p> <p><u>Red Oak:</u> Red Oak has a noticeable reddish tint. Pores are open and usually require filling before finishing. Drying must be done slowly to avoid checking and warping. Red Oak has good machining qualities.</p> <p><u>Poplar:</u> Poplar is a light weight moderately priced hard wood. It works well with hand and power tools. Its colour ranges from a pale olive brown to greenish white.</p> <p>Hard woods come from broad leaf (deciduous) trees. Soft woods come from needle leaf (coniferous) trees.</p> <p>Common wood defects include:</p> <ul style="list-style-type: none"> <li>– loose knots</li> <li>– checks or splits at the ends of boards</li> <li>– pitch pockets commonly found in soft woods</li> <li>– warping caused by improper drying and/or storage.</li> </ul>
2. What is the difference between a hard wood and a soft wood?	
3. Describe four common wood defects associated with solid lumber	

For additional items and responses refer to:

- *Exploring Woodworking: Fundamentals of Technology*. Fred W. Zimmerman et al. 1993. Text and Workbook.
- *Technology Shaping Our World*. John Gradwell et. al., 1996. Text and Instructor's Manual.

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**PROJECT ASSESSMENT: BUILDING WITH SOLID STOCK****Solid Stock Construction: CON1130-2****Module Learner Expectation**

*The student will:*

- construct a wooden product, using basic joinery techniques

**Standard**

Performance rating of 1 for each applicable task

**Rating Scale**

*The student:*

- exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards.*
- meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent.*
- meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent.*

- meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent.*

- has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

**TASK PERFORMANCE CRITERIA**

*The student:*

**Planning and Management**

- ☐ defines project requirement
- ☐ gathers background information from sources provided
- ☐ generates one or more project idea
- ☐ produces/modifies simple pattern or template
- ☐ provides accurate dimensions and notes

**Construction Techniques**

- ☐ cuts and squares stock according to plan
- ☐ assembles and glues stock correctly
- ☐ surfaces and finishes to size
- ☐ shapes handle according to pattern
- ☐ applies suitable finish

**Work Skills**

- ☐ follows instructions as directed
- ☐ adheres to established timeline
- ☐ works cooperatively with others in structured settings
- ☐ uses appropriate tools, materials and processes
- ☐ calculates and measures accurately
- ☐ uses recommended personal protective equipment
- ☐ handles, stores and/or disposes of materials as instructed

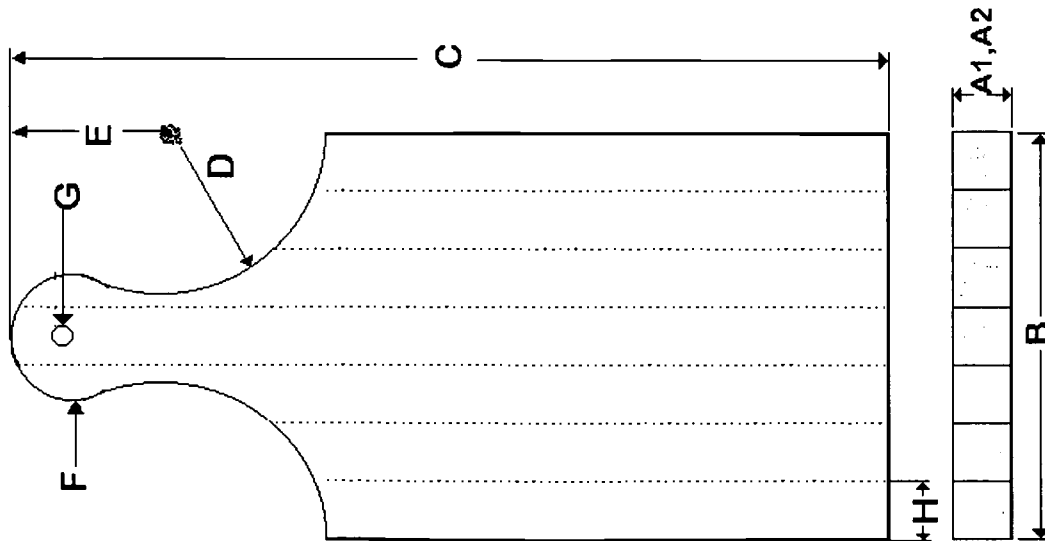
**Project Presentation (Output and Feedback)**

- ☐ describes the project and its intended use
- ☐ summarizes and reports on major production events
- ☐ assesses the design and production processes
- ☐ recommends changes to improve quality, performance and appearance

**PERFORMANCE ASSESSMENT**

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Planning and Management	4	3	2	1	0	1	
Construction Techniques	4	3	2	1	0	1	
Work Skills	4	3	2	1	0	1	
Project Presentation	4	3	2	1	0	1	





### Recommended Materials

1 – 19 mm x 160 mm x 305 mm (3/4" x 6 1/4" x 12") surfaced two sides maple or birch with vegetable oil finish.

### Specifications

Part	Metric	Imperial	Notes
A1	22 mm	7/8"	Rough size
A2	19 mm	3/4"	Finished size
B	135 mm	5 1/4"	Finished size
C	300 mm	11 3/4"	Finished size
D	50 mm R	2" R	Finished size
E	50 mm	2"	
F	22 mm R	7/8" R	Finished size
G	6 mm D	1/4" D	Centre hole
H	19 mm	3/4"	Finished size

### Quality Indicators

Assessment Criteria	Standard	Finished Product
Thickness 19 mm (3/4")	$\pm 2$ mm (1/16")	
Width 135 mm (5 1/4")	$\pm 2$ mm (1/16")	
Length 300 mm (11 3/4")	$\pm 2$ mm (1/16")	
Handle Shape	Evenly sculptured and smooth	
Surface Finish	Free of marks, gouges, burns and voids	

### Construction Overview

Steps	Event Sequence
1.	Cut stock to length
2.	Surface face sides if necessary
3.	Rip strips for gluing
4.	Assemble and glue stock
5.	Surface face sides
6.	Lay out pattern
7.	Cut out shape of board
8.	Drill hole in handle
9.	Surface edges to size
10.	Prepare surfaces for finishing
11.	Apply finish.

### COMMENTS:

Source: Adapted from material provided by the Northern Alberta Institute of Technology, Woodworking Section.



**RESPONSE ASSESSMENT: CHARACTERISTICS OF MANUFACTURED MATERIALS**      **Manufactured Materials: CON1160-1**

**Module Learner Expectation**

*The student will:*

- identify and describe the characteristics of common manufactured materials

**Standard**

Response rating of 1

**Rating Scale**

*The student:*

- 4 independently makes explanations and critical judgements based on a superior knowledge base and understanding of content and related issues.
- 3 makes explanation and comparisons of content using precise terminology. Requires little or no prompting.
- 2 applies knowledge of content to different situations using accurate terminology. May require some prompting.
- 1 uses simple recall to demonstrate basic knowledge and understanding of content. May require frequent prompting.
- 0 is unable to provide a suitable response at this time.

Sample Item(s)	Sample Response(s)
<ol style="list-style-type: none"> <li>List four manufactured sheet materials.</li> <li>Describe how they are made and identify one or more of their main characteristics.</li> </ol>	<p><u>Plywood:</u> Plywood is made from an odd number of thin sheets of wood glued together so that the grain is at right angles to the grain in the next layer. Plywood is very strong, resists warpage and can be finished in a variety of ways.</p> <p><u>Blockboard:</u> Blockboard is made from a core of solid pieces covered with a veneer on each side. Blockboard is strong and easily finished.</p> <p><u>Particleboard:</u> Particleboard is made from small wood chips that are glued and pressed together into sheets with very smooth surfaces suitable for painting or plastic laminates. Particle board tends to break easily and does not hold nails or screws well.</p> <p><u>Waferboard:</u> Waferboard is made from flakes of wood that are bonded together, under heat and pressure, with a waterproof adhesive. This material is strong and less expensive than plywood.</p>

For additional items and responses refer to:

- *Exploring Woodworking: Fundamentals of Technology.* Fred W. Zimmerman et al. 1993. Text and Workbook.
- *Technology Shaping Our World.* John Gradwell et. al., 1996. Text and Instructor's Manual.



**PROJECT ASSESSMENT: BUILDING WITH MANUFACTURED MATERIALS****Manufactured Materials: CON1160-2****Module Learner Expectation**

*The student will:*

- create a product from a manufactured material, using basic joinery techniques

**Standard**

Performance rating of 1 for each applicable task

**Rating Scale**

*The student:*

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards.*
- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent.*

- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent.*

- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent.*

- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

**TASK PERFORMANCE CRITERIA**

*The student:*

**Planning and Management**

- ☐ defines project requirement
- ☐ gathers background information from sources provided
- ☐ generates one or more project idea
- ☐ produces/modifies simple pictorial and or multiviewed sketch or drawing as required
- ☐ provides accurate dimensions and notes

**Construction Techniques**

- ☐ assembles and finishes according to the project plan
- ☐ cuts and squares stock according to plan
- ☐ assembles and fastens stock as indicated
- ☐ finishes surfaces as required

**Work Skills**

- ☐ uses appropriate tools, materials and processes
- ☐ measures and cuts accurately
- ☐ follows instructions as directed
- ☐ adheres to established timeline
- ☐ works cooperatively with others in structured settings
- ☐ uses recommended personal protective equipment
- ☐ handles, stores and/or disposes of materials as instructed

**Project Presentation**

- ☐ describes the project and its intended use
- ☐ summarizes and reports on major production events
- ☐ assesses the design and production processes
- ☐ recommends changes to improve quality, performance and appearance

**PERFORMANCE ASSESSMENT**

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Planning and Management	4	3	2	1	0	1	
Construction Techniques	4	3	2	1	0	1	
Work Skills	4	3	2	1	0	1	
Project Presentation	4	3	2	1	0	1	



A portable workbench can be put to many uses on the job or around the house. This project can be made from off-cuts of plywood and other manufactured materials. Besides availability, consideration should also be given to the strength and weight of the materials.



	Assessment Criteria	Standard	Finished Product
<b>DIMENSIONING</b>	- overall height: 410 mm	± 2mm	
	- overall width: 310 mm	± 2mm	
	- overall length: 610 mm	± 2mm	
	- location of hand hole	centred	
<b>SQUAREING</b>	- top is cut square	Run out not	
	- legs are cut square	more than	
	- supports are cut square	1 mm over	
	- tray is cut square	100 mm	
<b>ASSEMBLING</b>	- overall fit	tight	
	- use of fasteners	evenly	
	- wobble	spaced	
		stable on flat surface	
<b>FINISHING</b>	- evidence of chipping	minimal	
	- evidence of cross sanding	minimal	
	- coating	evenly applied	

MATERIAL ESTIMATE						COST ESTIMATE		
Component	#	T	W	L	Material Type	Material Amount	Unit Cost	Total Cost
TIME ESTIMATE    Start _____ Finish _____						FINISH: \$ _____		
							SUB-TOTAL: \$ _____	
							SHOP FEE: \$ _____	
TOTAL HOURS: _____						TOTAL COST: \$ _____		

Dimensions may need to be altered to fit available materials.  
Glue and nail simple edge and butt joints.



**RESPONSE ASSESSMENT: CHARACTERISTICS OF CASTING/MOLDING MATERIALS** **Mold Making & Casting: CON1180-1**

**Module Learner Expectation**

*The student will:*

- list and describe common materials and processes used in casting/molding

**Standard**

Response rating of 2

**Rating Scale**

*The student:*

- 4 independently makes explanations and critical judgements based on a superior knowledge base and understanding of content and related issues.
- 3 makes explanation and comparisons of content using precise terminology. Requires little or no prompting.
- 2 applies knowledge of content to different situations using accurate terminology. May require some prompting.
- 1 uses simple recall to demonstrate basic knowledge and understanding of content. May require frequent prompting.
- 0 is unable to provide a suitable response at this time.

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Sample Item(s)	Sample Response(s)
<ol style="list-style-type: none"> <li>1. Identify three common casting/molding materials.</li> <li>2. Describe how these materials are prepared for casting/molding.</li> </ol>	<p><u>Clay slip:</u> Water is added to clay to form a slurry that can be poured into a plaster mold.</p> <p><u>Concrete</u> Concrete is a mixture of water, aggregate (sand and gravel) and cement that can be poured into a mold for form.</p> <p><u>Polystyrene beads</u> Polystyrene beads are heated in a chamber to a liquid state and then forced into a mold cavity by means of an injection press.</p>

For additional items and responses, refer to:

- *Production Technology*. Stanley G. Komacek, 1993. Text.
- *Design and Technology*. Kathy Browning et. al., 1994. Teacher's Resource.

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# RESEARCH PROCESS: PREPARING A BUILDING SITE

# Site Preparation: CON2010-1

## Module Learner Expectation

The student will:

- identify and describe typical building site layout and excavation processes

## Standard

Performance rating of 2 for each applicable task

## Rating Scale

The student:

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*
- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*
- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*

- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*
- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

## TASK PERFORMANCE CRITERIA

<b>The student:</b>	
<b>Preparation and Planning</b>	<b>Content (continued)</b>
<input type="checkbox"/> sets goals and establishes steps to achieve them	<input type="checkbox"/> identifies and describes typical tools used in site work
<input type="checkbox"/> creates and adheres to useful timelines	<input type="checkbox"/> describes how batterboards and building lines are located
<input type="checkbox"/> uses personal initiative to formulate questions and find answers	<input type="checkbox"/> discusses methods of excavating
<input type="checkbox"/> plans and uses time effectively	<input type="checkbox"/> determines soil conditions
<b>Information Gathering and Processing</b>	<input type="checkbox"/> describes hazards related to excavation and the need to locate all utility services
<input type="checkbox"/> accesses a range of relevant school/community information resources	<input type="checkbox"/> assesses need for backslapping or shoring unstable soil
<input type="checkbox"/> uses a range of information-gathering techniques	<b>Collaboration and Teamwork</b>
<input type="checkbox"/> interprets, organizes and combines information into a logical sequence	<input type="checkbox"/> cooperates with group members
<input type="checkbox"/> determines accuracy/currency/reliability of information sources	<input type="checkbox"/> shares work appropriately among group members
<b>Content</b>	<input type="checkbox"/> negotiates solutions to problems
<input type="checkbox"/> determines parameters for selecting a building site including local codes, relation to other buildings, solar orientation and other local conditions	<b>Information Sharing</b>
<input type="checkbox"/> describes typical methods to establish grade levels, lot and building lines	<input type="checkbox"/> demonstrates effective use of two or more communication media: <i>e.g., written, oral, audio-visual</i>
	<input type="checkbox"/> communicates ideas in a logical sequence with sufficient supporting detail
	<input type="checkbox"/> maintains acceptable grammatical and technical standards
	<input type="checkbox"/> cites two or more basic information sources

## PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Preparation and Planning	4 3 2 1 0	2	
Information Gathering and Processing	4 3 2 1 0	2	
Content	4 3 2 1 0	2	
Collaboration and Teamwork	4 3 2 1 0	2	
Information Sharing	4 3 2 1 0	2	



**ACTIVITY ASSESSMENT: BUILDING SITE LAYOUT****Site Preparation: CON2010-2****Module Learner Expectation***The student will:*

- apply site preparation skills to assist in the location of building site lines and features

**Standard**

Performance rating of 2 or as stated for each applicable task

**Rating Scale***The student:*

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularity details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*
- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*
- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*
- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*
- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

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**Assessment Tools**

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**TASK PERFORMANCE CRITERIA***The student:***Planning and Management**

- ☐ prepares self for task
- ☐ organizes and works in an orderly manner
- ☐ interprets and carries out instructions accurately
- ☐ plans and uses time effectively
- ☐ adheres to routine procedures

**Construction Techniques**

- ☐ uses plot plan to determine property lines, setback and finish grade
- ☐ lays out building features using a builders transit or level
- ☐ locates building lines using batterboards and plumb bob
- ☐ checks for square using 3, 4, 5 method

**Use of Equipment and Materials**

- ☐ selects and uses appropriate equipment/materials safely
- ☐ uses proper personal protective equipment
- ☐ follows proper lifting and handling procedures
- ☐ calculates and measures accurately
- ☐ minimizes waste of materials
- ☐ recognizes and controls potential health and safety hazards

**Teamwork**

- ☐ cooperates with group members
- ☐ shares work appropriately among group members
- ☐ negotiates solutions to problems

**PERFORMANCE ASSESSMENT**

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Planning and Management	4	3	2	1	0	2	
Construction Techniques	4	3	2	1	0	1	
Use of Equipment and Materials	4	3	2	1	0	2	
Teamwork	4	3	2	1	0	2	

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## RESPONSE ASSESSMENT: CONCRETE FORMING

## Concrete Forming: CON2020-1

### Module Learner Expectations

#### *The student:*

- list and describe factors that affect footing and wall design
- identify and describe common forming materials and processes

### Standard

Response rating of 2

### Rating Scale

#### *The student:*

- 4 independently makes explanations and critical judgements based on a superior knowledge base and understanding of content and related issues.
- 3 makes explanations and comparisons of content using precise terminology. Requires little or no prompting.
- 2 applies knowledge of content to different situations using accurate terminology. May require some prompting.
- 1 uses simple recall to demonstrate basic knowledge and understanding of content. May require frequent prompting.
- 0 is unable to provide a suitable response at this time.

Sample Item(s)	Sample Response(s)
1. List the factors that affect footing and wall design.	Factors that affect footing and wall design include: <ul style="list-style-type: none"> <li>• soil, water and frost conditions</li> <li>• site and building features.</li> </ul>
2. Describe the important features of a concrete form.	Formwork for a concrete structure must be tight enough to prevent leaking, well braced and tied together to withstand the pressure of the concrete before it hardens. In addition, the forms should be easy to handle and strip.
3. Identify and describe two forming systems used in residential construction.	<p><u>Prefabricated panels</u></p> <p>This system commonly uses predrilled plywood panels, snap ties and walers to create a form. The panels are reusable and adaptable to a wide variety of foundation shapes.</p> <p><u>Polystyrene Block</u></p> <p>This system uses interlocking hollow polystyrene foam blocks that remain in place after they are filled with concrete. Besides using less concrete the system does not require additional insulation.</p>
4. Give two reasons for applying a release agent to a set of wall forms.	<p>A release agent is applied to a form to:</p> <ul style="list-style-type: none"> <li>• prevent the forms from sticking to the concrete</li> <li>• protect the form from peeling.</li> </ul>

For additional items and responses, refer to:

- *Modern Carpentry*. Willis H. Wagner et. al., 1992 and 1996 editions. Text and Workbook.



**ACTIVITY ASSESSMENT: CONCRETE FORMING AND PLACING****Concrete Forming: CON2020-2****Module Learner Expectation**

*The student will:*

- apply concrete forming skills to assist in forming and placing a concrete foundation

**Standard**

Performance rating of 2 for each applicable task

**Rating Scale**

*The student:*

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*
- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*
- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*
- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*
- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

**TASK PERFORMANCE CRITERIA**

*The student:*

**Planning and Management**

- ☐ prepares self for task
- ☐ organizes and works in an orderly manner
- ☐ interprets and carries out instructions accurately
- ☐ plans and uses time effectively

**Construction Techniques**

- ☐ uses foundation plan to locate and size all openings
- ☐ adjusts forms to accommodate box sill or cast in place construction
- ☐ assembles components to meet stated dimension tolerances

- ☐ reinforces forms to maintain their position
- ☐ consolidates concrete to prevent honeycombing
- ☐ levels and finishes concrete appropriately
- ☐ allows concrete to cure properly before stripping

**Use of Equipment and Materials**

- ☐ selects and uses appropriate equipment/materials safely
- ☐ uses proper personal protective equipment
- ☐ follows proper lifting and handling procedures
- ☐ calculates and measures accurately
- ☐ minimizes waste of materials
- ☐ recognizes and controls potential health & safety hazards

**Teamwork**

- ☐ cooperates with group members
- ☐ shares work appropriately among group members
- ☐ negotiates solutions to problems

**PERFORMANCE ASSESSMENT**

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Planning and Management	4	3	2	1	0	2	
Construction Techniques	4	3	2	1	0	2	
Use of Equipment and Materials	4	3	2	1	0	2	
Teamwork	4	3	2	1	0	2	



**PRESENTATIONS/REPORTS: WOOD FOUNDATIONS****Alternate Foundations: CON2030-1****Module Learner Expectations***The student will:*

- identify and describe the components of an alternative foundation system
- identify the health hazards and precautions related to the use of engineered materials

**Standard**

Performance rating of 2 or as stated for each applicable task

**Rating Scale***The student:*

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*
- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*
- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*

- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*

- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

**TASK PERFORMANCE CRITERIA***The student:*

- Preparation and Planning**
- ☐ sets goals and describes steps to achieve them
  - ☐ uses personal initiative to formulate questions and find answers
  - ☐ accesses a range of relevant in-school/community information sources
  - ☐ interprets, organizes and combines information into logical sequence
  - ☐ records information accurately with appropriate supporting detail and uses correct technical terms
  - ☐ plans and uses time effectively

**Content**

- ☐ identifies factors that affect the design of a wood foundation, such as:
  - number of floors
  - live loads
  - lateral stress

- ☐ describes the design features of a preserved wood foundations, including:
  - gravel base and drainage system
  - framing features complete with window opening
  - sheathing and caulking procedures
  - protective covering
  - finishing techniques

**Content (continued)**

- ☐ explains the health hazards and safety precautions that are required when using treated materials and wood preservatives such as:
  - wearing a dust mask
  - washing exposed areas of skin before eating
  - laundering clothes separate from other clothes
  - not burning treated wood

**Presenting/Reporting**

- ☐ demonstrates effective use of one or more communication media

*e.g., Written: spelling, punctuation, grammar basic format*

*Oral: voice projection, body language*

*Audio-visual: techniques, tools*

- ☐ maintains acceptable grammatical and technical standards through proofreading and editing
- ☐ provides an introduction that describes the purpose and scope of the project
- ☐ communicates ideas into a logical sequence with sufficient supporting detail
- ☐ provides a reference list that includes two or more relevant information sources

**PERFORMANCE ASSESSMENT**

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Preparation and Planning	4	3	2	1	0	2	
Content	4	3	2	1	0	1	
Presenting/Reporting	4	3	2	1	0	2	



**ACTIVITY ASSESSMENT: WOOD FOUNDATION FRAMING****Alternate Foundations: CON2030-2****Module Learner Expectation**

*The student will:*

- apply construction skills to assist in the design/construction of an alternative foundation system

**Standard**

Performance rating of 2 for each applicable task

**Rating Scale**

*The student:*

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*

- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*

- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*

- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*

- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

**TASK PERFORMANCE CRITERIA**

*The student:*

**Planning and Management**

- ☐ prepares self for task
- ☐ organizes and works in an orderly manner
- ☐ interprets and carries out instructions accurately
- ☐ plans and uses time effectively

**Construction Techniques**

- ☐ follows design specification for order and/or selecting materials
- ☐ creates appropriate gravel base
- ☐ frames and sheaths walls according to the engineering drawings
- ☐ seals and protects exterior surfaces
- ☐ back fills and finishes according to plan

**Use of Equipment and Materials**

- ☐ selects and uses appropriate equipment/materials safely
- ☐ uses proper personal protective equipment
- ☐ follows proper lifting and handling procedures
- ☐ calculates and measures accurately
- ☐ minimizes waste of materials
- ☐ recognizes and controls potential health and safety hazards

**Teamwork**

- ☐ cooperates with group members
- ☐ shares work appropriately among group members
- ☐ negotiates solutions to problems

**PERFORMANCE ASSESSMENT**

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Planning and Management	4	3	2	1	0	2	
Construction Techniques	4	3	2	1	0	2	
Use of Equipment and Materials	4	3	2	1	0	2	
Teamwork	4	3	2	1	0	2	

**Assessment Tools**

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(1997)



## RESPONSE ASSESSMENT: FLOOR AND WALL FRAMING

## Framing Systems 1 (Floor & Wall): CON2040-1

### Module Learner Expectation

*The student will:*

- identify and describe the parts of a floor and wall framing system

### Standard

Response rating of 2

### Rating Scale

*The student:*

- 4 independently makes explanations and critical judgements based on a superior knowledge base and understanding of content and related issues.
- 3 makes explanation and comparisons of content using precise terminology. Requires little or no prompting.
- 2 applies knowledge of content to different situations using accurate terminology. May require some prompting.
- 1 uses simple recall to demonstrate basic knowledge and understanding of content. May require frequent prompting.
- 0 is unable to provide a suitable response at this time.

Sample Item(s)	Sample Response(s)
<ol style="list-style-type: none"> <li>1. Identify and describe two systems used to frame residential structures.</li> <li>2. From a floor frame mock-up or diagram, identify the following parts: <ul style="list-style-type: none"> <li>• single and double header</li> <li>• regular joist</li> <li>• tail joist</li> <li>• cantilever joist</li> <li>• double trimmer</li> <li>• bridging.</li> </ul> </li> <li>3. From a floor frame mock-up or diagram, identify the following parts: <ul style="list-style-type: none"> <li>• sole plate</li> <li>• regular stud</li> <li>• top and cap plates</li> <li>• rough sill</li> <li>• lintel header</li> <li>• trimmer</li> <li>• upper and lower crippler.</li> </ul> </li> <li>4. From a current National Building Code of Canada table, determine the maximum span of a 38 x 235 #1 Douglas Fir joist with diagonal bridging only on 400 mm spacing for living quarters.</li> </ol>	<p><u>Platform Framing.</u> In platform construction the floor is constructed first followed by the walls that can be constructed ahead of time off site or assembled on site after the sub-floor is applied.</p> <p><u>Balloon Framing</u> Balloon framing is used in two story structures. The studs extend from the sill plate to the top plate of the second floor. This system eliminates the need for an joint to allow for shrinkage between floors.</p> <p>According to the 1990 edition of the National Building Code, the maximum span is 4.38 m.</p>

For additional items and responses, refer to:

- *Modern Carpentry.* Willis H. Wagner et. al., 1996. Text and Instructor's Manual.



**ACTIVITY ASSESSMENT: FLOOR AND WALL FRAMING****Framing Systems 1 (Floor & Wall): CON2040-2****Module Learner Expectations**

*The student will:*

- read and interpret the appropriate drawings and specifications to create a floor and wall framing and sheathing estimate
- apply framing skills to assist in the layout and construction of floor and wall components

**Standard**

Performance rating of 2 for each applicable task

**Rating Scale**

*The student:*

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*

- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*

- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*

- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*

- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

**TASK PERFORMANCE CRITERIA**

*The student:*

**Planning and Management**

- ☐ prepares self for task
- ☐ organizes and works in an orderly manner
- ☐ interprets and carries out instructions accurately
- ☐ plans and uses time effectively
- ☐ prepares a list of materials, cost estimate and cutting lists from a set of working drawings
- ☐ calculates waste and over-run requirements

**Use of Equipment and Materials**

- ☐ selects and uses appropriate equipment/materials safely
- ☐ uses proper personal protective equipment
- ☐ follows proper lifting and handling procedures
- ☐ calculates and measures accurately
- ☐ minimizes waste of materials
- ☐ recognizes and controls potential health and safety hazards

**Construction Techniques**

- ☐ follows floor and wall plan to lay out components
- ☐ cuts and assembles framing components according to plan
- ☐ squares floor and wall components prior to installing sub-floor and wall sheathing
- ☐ erects, plumbs and braces wall sections

**Teamwork**

- ☐ cooperates with group members
- ☐ shares work appropriately among group members
- ☐ negotiates solutions to problems

**PERFORMANCE ASSESSMENT**

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Planning and Management	4	3	2	1	0	2	
Construction Techniques	4	3	2	1	0	2	
Use of Equipment and Materials	4	3	2	1	0	2	
Teamwork	4	3	2	1	0	2	



## RESPONSE ASSESSMENT: ROOF CONSTRUCTION

## Roof Structures 1 (Framing & Finishing): CON2050-1

### Module Learner Expectation

*The student will:*

- identify and describe the different styles and parts of a roof system

### Standard

Response rating of 2

### Rating Scale

*The student:*

- 4 independently makes explanations and critical judgements based on a superior knowledge base and understanding of content and related issues.
- 3 makes explanation and comparisons of content using precise terminology. Requires little or no prompting.
- 2 applies knowledge of content to different situations using accurate terminology. May require some prompting.
- 1 uses simple recall to demonstrate basic knowledge and understanding of content. May require frequent prompting.
- 0 is unable to provide a suitable response at this time.

Sample Item(s)	Sample Response(s)
<ol style="list-style-type: none"> <li>1. From pictures or diagrams, identify the following styles and parts of roof systems: <ul style="list-style-type: none"> <li>• gable</li> <li>• hip</li> <li>• shed</li> <li>• gambrel.</li> </ul> </li> <li>2. Identify and describe two common methods of framing a roof.</li> </ol>	<p><u>Rafter System</u> Traditional rafter systems are still used for unusual roof designs, for open ceilings or attic space requirements.</p> <p><u>Truss System</u> Roof trusses are prefabricated components that are designed and built in a factory to meet most roof shapes and loading specifications. Trusses can be erected quickly and easily.</p>
<ol style="list-style-type: none"> <li>3. From a mock-up or drawing, identify the parts of rafter systems: <ul style="list-style-type: none"> <li>• common rafter</li> <li>• ridge board</li> <li>• collar tie</li> <li>• ceiling joist.</li> </ul> </li> <li>4. From a standard W or Fink truss, identify the following members: <ul style="list-style-type: none"> <li>• top chord</li> <li>• bottom cord</li> <li>• tension web</li> <li>• compression web.</li> </ul> </li> </ol>	

For additional items and responses, refer to:

- *Modern Carpentry*. William H. Wagner et. al., 1996. Text and Instructor's Manual.



**ACTIVITY ASSESSMENT: ROOF CONSTRUCTION****Roof Structures 1 (Framing & Finishing): CON2050-2****Module Learner Expectations**

*The student will:*

- read and interpret the appropriate drawings and specifications to create a roof framing and finishing estimate
- apply roofing skills to assist in the framing and finishing of a roof structure

**Standard**

Performance rating of 2 for each applicable task

**Rating Scale**

*The student:*

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*

- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*

- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*

- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*

- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

**Assessment Tools**

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**TASK PERFORMANCE CRITERIA**

*The student:*

**Planning and Management**

- ☐ prepares self for task
- ☐ organizes and works in an orderly manner
- ☐ interprets and carries out instructions accurately
- ☐ plans and uses time effectively
- ☐ prepares a material list from a roof plan
- ☐ creates a cutting list
- ☐ calculates waste and over run requirements
- ☐ estimates material costs

**Use of Equipment and Materials**

- ☐ selects and uses appropriate equipment/materials safely
- ☐ uses proper personal protective equipment
- ☐ follows proper lifting and handling procedures
- ☐ calculates and measures accurately
- ☐ minimizes waste of materials
- ☐ recognizes and controls potential health and safety hazards

**Construction Techniques**

- ☐ cuts and/or assembles rafters/trusses according to plan
- ☐ plumbs and braces roof components
- ☐ install look-outs, fascia and braces
- ☐ applies sheathing and shingles according to manufacturers recommendations

**Teamwork**

- ☐ cooperates with group members
- ☐ shares work appropriately among group members
- ☐ negotiates solutions to problems

**PERFORMANCE ASSESSMENT**

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Planning and Management	4	3	2	1	0	2	
Construction Techniques	4	3	2	1	0	2	
Use of Equipment and Materials	4	3	2	1	0	2	
Teamwork	4	3	2	1	0	2	



## Module Learner Expectation

The student will:

- identify and describe common types of exterior doors, windows and siding materials

## Standard

Performance rating of 2 or as stated for each applicable task

## Rating Scale

The student:

- exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*
- meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*
- meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*

- meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*

- has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

## TASK PERFORMANCE CRITERIA

<i>The student</i>	<p><b>Content</b> (continued)</p> <ul style="list-style-type: none"> <li>lists and describes two door types, e.g.: <ul style="list-style-type: none"> <li>wood</li> <li>metal</li> <li>fibreglass</li> </ul> </li> <li>lists and describes wood, vinyl and aluminium siding materials and installation techniques</li> </ul>
<b>Preparation and Planning</b>	<ul style="list-style-type: none"> <li>sets goals and describes steps to achieve them</li> <li>uses personal initiative to formulate questions and find answers</li> <li>accesses a range of relevant in-school/community information sources</li> <li>interprets, organizes and combines information into logical sequence</li> <li>records information accurately with appropriate supporting detail and uses correct technical terms</li> <li>plans and uses time effectively</li> </ul>
<b>Presenting/Reporting</b>	<ul style="list-style-type: none"> <li>demonstrates effective use of one or more communication media <i>e.g., Written: spelling, punctuation, grammar basic format</i></li> <li><i>Oral: voice projection, body language</i></li> <li><i>Audio-visual: techniques, tools</i></li> <li>maintains acceptable grammatical and technical standards through proofreading and editing</li> <li>provides an introduction that describes the purpose and scope of the project</li> <li>communicates ideas into a logical sequence with sufficient supporting detail</li> <li>provides a reference list that includes two or more relevant information sources</li> </ul>
<b>Content</b>	<ul style="list-style-type: none"> <li>lists and describes three basic window designs, e.g.: <ul style="list-style-type: none"> <li>sliding</li> <li>swing</li> <li>fixed</li> </ul> </li> </ul>

## PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Preparation and Planning	4	3	2	1	0	2	
Content	4	3	2	1	0	1	
Presenting/ Reporting	4	3	2	1	0	2	



# ACTIVITY ASSESSMENT: INSTALLING DOORS, WINDOWS AND SIDING Exterior Finishing (Door, Window & Siding): CON2060-2

## Module Learner Expectations

*The student will:*

- read and interpret the appropriate drawings and specifications to create a door and window schedule and siding estimate
- apply finishing skills to install a prehung door, a window unit and siding materials

## Standard

Performance rating of 2 for each applicable task

## Rating Scale

*The student:*

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*
- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*
- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*
- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*
- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

## TASK PERFORMANCE CRITERIA

*The student:*

### Planning and Management

- ☐ prepares self for task
- ☐ organizes and works in an orderly manner
- ☐ interprets and carries out instructions accurately
- ☐ plans and uses time effectively
- ☐ uses elevation drawings and notes to develop a door and window schedule
- ☐ reads elevation drawing to determine siding type and quantities
- ☐ calculates allowances for wall openings and waste requirements

### Construction Techniques

- ☐ prepares and installs window and doors according to manufacturer's recommendations
- ☐ installs siding according to standard practice and manufacturer's recommendations

### Use of Equipment and Materials

- ☐ selects and uses appropriate equipment/materials safely
- ☐ uses proper personal protective equipment
- ☐ follows proper lifting and handling procedures
- ☐ calculates and measures accurately
- ☐ minimizes waste of materials
- ☐ recognizes and controls potential hazards

### Teamwork

- ☐ cooperates with group members
- ☐ shares work appropriately among group members
- ☐ negotiates solutions to problems

## PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Planning and Management	4	3	2	1	0	2	
Construction Techniques	4	3	2	1	0	2	
Use of Equipment and Materials	4	3	2	1	0	2	
Teamwork	4	3	2	1	0	2	



## Module Learner Expectation

**The student will:**

- list and describe the electrical systems and components associated with residential wiring

## Standard

Performance rating of 2 or as stated for each applicable task

### Rating Scale

**The student:**

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*
- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*
- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*

1

meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

## TASK PERFORMANCE CRITERIA

*The student*

**Preparation and Planning**

- ☐ sets goals and describes steps to achieve them
- ☐ uses personal initiative to formulate questions and find answers
- ☐ accesses a range of relevant in-school/community information sources
- ☐ interprets, organizes and combines information into logical sequence
- ☐ records information accurately with appropriate supporting detail and uses correct technical terms
- ☐ plans and uses time effectively

**Content**

- ☐ identifies common types of electrical systems found in a modern residence, such as:
  - lighting
  - utility
  - heating
  - communication
  - alarm system

**Content (continued)**

- ☐ identifies the different voltage levels commonly found in each system
- ☐ lists four appliances and power requirements found in a home

**Presenting/Reporting**

- ☐ demonstrates effective use of one or more communication media  
e.g., Written: *spelling, punctuation, grammar basic format*
- ☐ Oral: *voice projection, body language*  
Audio-visual: *techniques, tools*
- ☐ maintains acceptable grammatical and technical standards through proofreading and editing
- ☐ provides an introduction that describes the purpose and scope of the project
- ☐ communicates ideas into a logical sequence with sufficient supporting detail
- ☐ provides a reference list that includes two or more relevant information sources

## PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Preparation and Planning	4	3	2	1	0	2	
Content	4	3	2	1	0	1	
Presenting/ Reporting	4	3	2	1	0	2	



**ACTIVITY ASSESSMENT: BRANCH WIRING****Electrical Systems: CON2070-2****Module Learner Expectations**

*The student will:*

- apply wiring principles and code requirements to create a wiring diagram
- apply wiring skills to assist in the installation of a residential wiring system

**Standard**

Performance rating of 2 for each applicable task

**Rating Scale**

*The student:*

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*
- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*
- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*
- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*
- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

**TASK PERFORMANCE CRITERIA**

*The student:*

**Planning and Management**

- ☐ prepares self for task
- ☐ organizes and works in an orderly manner
- ☐ interprets and carries out instructions accurately
- ☐ plans and uses time effectively
- ☐ uses standard drawing symbols
- ☐ clearly identifies connections and components
- ☐ follows code requirements

**Use of Equipment and Materials**

- ☐ selects and uses appropriate equipment/materials safely
- ☐ uses proper personal protective equipment
- ☐ follows proper lifting and handling procedures
- ☐ calculates and measures accurately
- ☐ minimizes waste of materials
- ☐ recognizes and controls potential health and safety hazards

**Construction Techniques**

- ☐ installs a branch circuit to include three or more of the following:
  - general purpose receptacle
  - light fixture
  - single and three-way switch
  - split receptacle
- ☐ follows drawing and code requirements
- ☐ tests circuits for continuity and correct grounding

**Teamwork**

- ☐ cooperates with group members
- ☐ shares work appropriately among group members
- ☐ negotiates solutions to problems

**PERFORMANCE ASSESSMENT**

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Planning and Management	4	3	2	1	0	2	
Construction Techniques	4	3	2	1	0	2	
Use of Equipment and Materials	4	3	2	1	0	2	
Teamwork	4	3	2	1	0	2	



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**PRESENTATIONS/REPORTS: COMMON PLUMBING SYSTEMS****Plumbing Systems: CON2080-1****Module Learner Expectation**

*The student will:*

- identify and describe the parts of a residential plumbing system

**Standard**

Performance rating of 2 or as stated for each applicable task

**Rating Scale**

*The student:*

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*
- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*
- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*

- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*
- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

**TASK PERFORMANCE CRITERIA**

<i>The student</i>		
<b>Preparation and Planning</b>		<b>Content (continued)</b>
<input type="checkbox"/> sets goals and describes steps to achieve them		<input type="checkbox"/> describes the types of pipes, tubes and fittings commonly found in a plumbing system
<input type="checkbox"/> uses personal initiative to formulate questions and find answers		<input type="checkbox"/> provide examples of how common pipes, tubes and fittings are joined together
<input type="checkbox"/> accesses a range of relevant in-school/community information sources		
<input type="checkbox"/> interprets, organizes and combines information into logical sequence		<b>Presenting/Reporting</b>
<input type="checkbox"/> records information accurately with appropriate supporting detail and uses correct technical terms		<input type="checkbox"/> demonstrates effective use of one or more communication media: <i>e.g., Written: spelling, punctuation, grammar basic format</i>
<input type="checkbox"/> plans and uses time effectively		<i>Oral: voice projection, body language</i>
<b>Content</b>		<i>Audio-visual: techniques, tools</i>
<input type="checkbox"/> identifies the parts of a residential plumbing system:		<input type="checkbox"/> maintains acceptable grammatical and technical standards through proofreading and editing
– water supply		<input type="checkbox"/> provides an introduction that describes the purpose and scope of the project
– drainage		<input type="checkbox"/> communicates ideas into a logical sequence with sufficient supporting detail
– waste		<input type="checkbox"/> provides a reference list that includes two or more relevant information sources
– venting systems		

**PERFORMANCE ASSESSMENT**

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Preparation and Planning	4	3	2	1	0	2	
Content	4	3	2	1	0	1	
Presenting/ Reporting	4	3	2	1	0	2	



**ACTIVITY ASSESSMENT: INSTALLING A PLUMBING FIXTURE****Plumbing Systems: CON2080-2****Module Learner Expectations**

*The student will:*

- create a drawing of a water supply, drainage, waste and vent system for a typical plumbing fixture
- apply plumbing skills to assist in the installation of a water supply, waste and vent system

**Standard**

Performance rating of 2 for each applicable task

**Rating Scale**

*The student:*

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*

- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*

- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*

- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*

- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

**TASK PERFORMANCE CRITERIA**

*The student:*

**Planning and Management**

- ☐ prepares self for task
- ☐ organizes and works in an orderly manner
- ☐ interprets and carries out instructions accurately
- ☐ plans and uses time effectively
- ☐ uses standard symbols and drawing techniques
- ☐ clearly identifies components and piping materials

**Construction Techniques**

- ☐ roughs in plumbing according to plan
- ☐ tests system for leaks
- ☐ installs fixtures according to manufacturer's recommendations

**Use of Equipment and Materials**

- ☐ selects and uses appropriate equipment/materials safely
- ☐ uses proper personal protective equipment
- ☐ follows proper lifting and handling procedures
- ☐ calculates and measures accurately
- ☐ minimizes waste of materials
- ☐ recognizes and controls potential health and safety hazards

**Teamwork**

- ☐ cooperates with group members
- ☐ shares work appropriately among group members
- ☐ negotiates solutions to problems

**PERFORMANCE ASSESSMENT**

CRITERIA	STUDENT RATING				STANDARD	COMMENTS
Planning and Management	4	3	2	1	0	2
Construction Techniques	4	3	2	1	0	2
Use of Equipment and Materials	4	3	2	1	0	2
Teamwork	4	3	2	1	0	2



**RESEARCH PROCESS: CAREER OPPORTUNITIES IN PLUMBING****Plumbing Systems: CON2080-3****Module Learner Expectation**

*The student will:*

- profile a trade or occupation within the plumbing field

**Standard**

Performance rating of 2 for each applicable task

**Rating Scale**

*The student:*

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*
- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*
- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*
- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*
- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

**TASK PERFORMANCE CRITERIA**

*The student:*

**Preparation and Planning**

- ☐ sets goals and establishes steps to achieve them
- ☐ creates and adheres to timelines
- ☐ uses personal initiative to formulate questions and find answers
- ☐ plans and uses time effectively

**Information Gathering and Processing**

- ☐ accesses a range of relevant school/community information resources
- ☐ uses a range of information-gathering techniques
- ☐ interprets, organizes and combines information into a logical sequence
- ☐ determines accuracy/currency/reliability of information sources

**Content**

- ☐ identifies one or more occupation or trade related to plumbing
- ☐ lists day-to-day duties of a worker or trades person
- ☐ describes overall working conditions
- ☐ assesses local employment opportunities
- ☐ identifies training programs and entry requirements

**Information Sharing**

- ☐ demonstrates effective use of two or more communication media:  
*e.g., written, oral, audio-visual*
- ☐ communicates ideas in a logical sequence with sufficient supporting detail
- ☐ maintains acceptable grammatical and technical standards
- ☐ cites one or more basic information sources

**PERFORMANCE ASSESSMENT**

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Preparation and Planning	4	3	2	1	0	2	
Information Gathering and Processing	4	3	2	1	0	2	
Content	4	3	2	1	0	2	
Information Sharing	4	3	2	1	0	2	



**RESPONSE ASSESSMENT: HEATING, VENTILATING AND COOLING SYSTEMS** **Climate Control Systems: CON2090-1**

**Module Learner Expectation**

*The student will:*

- list and describe the major components of a typical heating, ventilating and air conditioning system

**Standard**

Response rating of 2

**Rating Scale**

*The student:*

- 4 independently makes explanations and critical judgements based on a superior knowledge base and understanding of content and related issues.
- 3 makes explanation and comparisons of content using precise terminology. Requires little or no prompting.
- 2 applies knowledge of content to different situations using accurate terminology. May require some prompting.
- 1 uses simple recall to demonstrate basic knowledge and understanding of content. May require frequent prompting.
- 0 is unable to provide a suitable response at this time.

Sample Item(s)	Sample Response(s)
<ol style="list-style-type: none"> <li>Given a drawing or picture of a HVAC system, identify and describe the purpose of each of the following components: <ul style="list-style-type: none"> <li>– furnace / boiler / heat pump</li> <li>– humidifier</li> <li>– air conditioner</li> <li>– kitchen or bathroom vent.</li> </ul> </li> <li>Explain the difference between a radial and trunk branch heating or air conditioning system.</li> </ol>	<ul style="list-style-type: none"> <li>– a furnace provides heat by burning gas, liquid or solid fuel such as a natural gas, oil or coal.</li> <li>– to maintain the same level of relative humidity in a home, moisture is added to the heated air in a <u>humidifier</u>.</li> <li>– an <u>air conditioner</u> cools the air and reduces the humidity.</li> <li>– a bathroom or kitchen vent <u>exhausts</u> air directly outside using a fan.</li> </ul> <p>A radial system radiates out from a central point, whereas a trunk branch system branches off where needed from a horizontal air duct.</p>

For additional items and responses refer to:

- *Construction Technology*. Mark W. Huth, 1966. Text and Instructor's Manual
- *Illustrated Residential and Commercial Construction*. Peter A. Mann, 1989.



**ACTIVITY ASSESSMENT: MAINTAINING/INSTALLING A HVAC SYSTEM****Climate Control System: CON2090-2****Module Learner Expectations**

*The student will:*

- prepare a preventive maintenance schedule for a heating, ventilating and/or air conditioning system
- service or install a heating, ventilating and/or air conditioning system

**Standard**

Performance rating of 2 for each applicable task

**Rating Scale**

*The student:*

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*
- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*
- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*
- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*
- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

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**TASK PERFORMANCE CRITERIA**

*The student:*

**Planning and Management**

- ☐ prepares self for task
- ☐ organizes and works in an orderly manner
- ☐ interprets and carries out instructions accurately
- ☐ plans and uses time effectively

**Construction Techniques**

- ☐ lists components/parts to be serviced according to manufacturer's recommendations
- ☐ identifies frequency of service and procedures
- ☐ services a system component according to the prescribed schedule and procedure

**Use of Equipment and Materials**

- ☐ selects and uses appropriate equipment/materials safely
- ☐ uses proper personal protective equipment
- ☐ follows proper lifting and handling procedures
- ☐ calculates and measures accurately
- ☐ minimizes waste of materials
- ☐ recognizes and controls potential health and safety hazards

**Teamwork**

- ☐ cooperates with group members
- ☐ shares work appropriately among group members
- ☐ negotiates solutions to problems

**PERFORMANCE ASSESSMENT**

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Planning and Management	4	3	2	1	0	2	
Construction Techniques	4	3	2	1	0	2	
Use of Equipment and Materials	4	3	2	1	0	2	
Teamwork	4	3	2	1	0	2	



# RESEARCH PROCESS: CAREER OPPORTUNITIES IN HEATING & AIR CONDITIONING

## Climate Control Systems: CON2090-3

### Module Learner Expectation

*The student will:*

- profile a trade or occupation within the heating and air conditioning fields

### Standard

Performance rating of 2 for each applicable task

### Rating Scale

*The student:*

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*
- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*
- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*
- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*
- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

### TASK PERFORMANCE CRITERIA

<i>The student:</i>	Content
<b>Preparation and Planning</b>	<input type="checkbox"/> identifies one or more occupation or trade related to heating and air conditioning <input type="checkbox"/> lists day-to-day duties of a worker or trades person <input type="checkbox"/> describes overall working conditions <input type="checkbox"/> assesses local employment opportunities <input type="checkbox"/> identifies training programs and entry requirements
<b>Information Gathering and Processing</b>	<input type="checkbox"/> demonstrates effective use of two or more communication media: <i>e.g., written, oral, audio-visual</i> <input type="checkbox"/> communicates ideas in a logical sequence with sufficient supporting detail <input type="checkbox"/> maintains acceptable grammatical and technical standards <input type="checkbox"/> cites one or more basic information sources
<b>Information Sharing</b>	<input type="checkbox"/> demonstrates effective use of two or more communication media: <i>e.g., written, oral, audio-visual</i> <input type="checkbox"/> communicates ideas in a logical sequence with sufficient supporting detail <input type="checkbox"/> maintains acceptable grammatical and technical standards <input type="checkbox"/> cites one or more basic information sources

### PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Preparation and Planning	4	3	2	1	0	2	
Information Gathering and Processing	4	3	2	1	0	2	
Content	4	3	2	1	0	2	
Information Sharing	4	3	2	1	0	2	



**PROJECT ASSESSMENT: BUILDING AN AGRI-STRUCTURE****Agri-structures: CON2100-1****Module Learner Expectations***The student will:*

- identify the major issues that must be addressed when designing an agri-structure
- read and interpret the appropriate drawings and specifications to create a material and cost estimate
- construct a structure for use in agriculture

**Standard**

Performance rating of 2 for each applicable task

**Rating Scale***The student:*

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*
- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*
- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*
- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*
- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

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**TASK PERFORMANCE CRITERIA***The student:***Planning and Management**

- ☐ defines needs considering:
  - human and environmental safety
  - animal comfort and safety and/or crop protection
  - capacity and ease of use
  - construction costs
- ☐ conducts research to determine potential design
- ☐ produces a drawing of a suitable design

**Construction Techniques**

- ☐ selects and safely uses appropriate tools, materials and processes
- ☐ calculates and measures accurately
- ☐ constructs the product according to the design specifications
- ☐ meets stated standards for:
  - dimensioning
  - squaring
  - assembling
  - finishing

**Work Skills**

- ☐ follows instructions with limited direction
- ☐ organizes work in an orderly manner
- ☐ works cooperatively with others in both structured and non-structured settings
- ☐ uses correct personal protective equipment
- ☐ follows proper lifting and handling procedures
- ☐ fulfills expected clean-up responsibilities
- ☐ stores and disposes materials according to recommended procedures

**Project Presentation**

- ☐ describes the purpose of the project
- ☐ summarizes and reports on major events
- ☐ assesses design processes and production techniques
- ☐ suggests possible improvements to the design and construction processes

**PERFORMANCE ASSESSMENT**

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Planning and Management	4	3	2	1	0	2	
Construction Techniques	4	3	2	1	0	2	
Work Skills	4	3	2	1	0	2	
Project Presentation	4	3	2	1	0	2	



**PROJECT ASSESSMENT: PRODUCTS FROM MULTIPLE MATERIALS****Multiple Materials: CON2120-1****Module Learner Expectations**

*The student will:*

- identify advantages of using different material in a product.
- apply knowledge of structural materials, planning and construction techniques to produce a product from different materials.

**Standard**

Performance rating of 2 for each applicable task

**Rating Scale**

*The student:*

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*
- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*
- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*
- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*
- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

**TASK PERFORMANCE CRITERIA**

*The student:*

**Planning and Management**

- ☐ defines material requirements in terms of:
  - major properties
  - serviceability
  - ease of construction
  - cost of materials
  - appearance
- ☐ conducts research to determine potential design
- ☐ produces a drawing or sketch of a suitable design

**Construction Process**

- ☐ constructs the product according to the design specifications
- ☐ meets stated standards for:
  - dimensioning
  - squaring
  - assembling
  - finishing

**Work Skills**

- ☐ follows instructions with limited direction
- ☐ organizes work in an orderly manner
- ☐ selects and safely uses appropriate tools, materials and processes
- ☐ calculates and measures accurately
- ☐ works cooperatively with others in both structured and non-structured settings
- ☐ uses correct personal protective equipment
- ☐ follows proper lifting and handling procedures
- ☐ fulfills expected clean-up responsibilities
- ☐ stores and disposes materials according to recommended procedures

**Project Presentation**

- ☐ describes the purpose of the project
- ☐ summarizes and reports on major events
- ☐ assesses design processes and production techniques
- ☐ suggests possible improvements to the design and construction processes

**PERFORMANCE ASSESSMENT**

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Planning and Management	4	3	2	1	0	2	
Construction Techniques	4	3	2	1	0	2	
Work Skills	4	3	2	1	0	2	
Project Presentation	4	3	2	1	0	2	



**PROJECT ASSESSMENT: BOX CONSTRUCTION****Furniture Making 1 (Box Construction): CON2130-1****Module Learner Expectations**

*The student will:*

- identify advantages of using different materials in a product
- apply knowledge of structural materials, planning, and construction techniques to produce a product from different materials

**Standard**

Performance rating of 2 for each applicable task

**Rating Scale**

*The student:*

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularity details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals. Analyzes and provides effective client/customer services beyond expectations.*
- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort. Analyzes and provides effective client/customer services.*
- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals. Identifies and provides customer/client services.*
- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively. Provides a limited range of customer/client services.*
- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

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**TASK PERFORMANCE CRITERIA**

*The student:*

<b>Planning and Management</b>		<b>Work Skills</b>
<input type="checkbox"/> analyzes an existing piece of furniture or drawing to:		<input type="checkbox"/> follows instructions with limited direction
• identify materials used in structural components		<input type="checkbox"/> organizes work in an orderly manner
• identify structural features, such as joints and fasteners		<input type="checkbox"/> works cooperatively with others in both structured and non-structured settings
• examine points of weakness		<input type="checkbox"/> uses correct personal protective equipment
<input type="checkbox"/> produces or modifies the appropriate drawings		<input type="checkbox"/> follows proper lifting and handling procedures
		<input type="checkbox"/> fulfills expected clean-up responsibilities
		<input type="checkbox"/> stores and disposes materials according to recommended procedures
<b>Construction Techniques</b>		<b>Project Presentation</b>
<input type="checkbox"/> selects and safely uses appropriate tools, materials and processes		<input type="checkbox"/> describes the purpose of the project
<input type="checkbox"/> calculates and measures accurately		<input type="checkbox"/> summarizes and reports on major events
<input type="checkbox"/> constructs the product according to the design specifications		<input type="checkbox"/> assesses design processes and production techniques
<input type="checkbox"/> meets stated standards for:		<input type="checkbox"/> suggests possible improvements to the design and construction processes
• dimensioning		
• squaring		
• assembling		
• finishing		

**PERFORMANCE ASSESSMENT**

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Planning and Management	4	3	2	1	0	2	
Construction Techniques	4	3	2	1	0	2	
Work Skills	4	3	2	1	0	2	
Project Presentation	4	3	2	1	0	2	



**PROJECT ASSESSMENT: FRAME AND PANEL CONSTRUCTION****Furniture Making 2 (Frame & Panel): CON2140-1****Module Learner Expectations**

*The student will:*

- identify and describe the design features and processes used to construct a box-type furniture product
- apply basic furniture-making skills to plan and construct a component or piece of furniture based on frame and panel construction techniques

**Standard**

Performance rating of 2 for each applicable task

**Rating Scale**

*The student:*

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*
- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*
- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*
- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*
- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

**TASK PERFORMANCE CRITERIA**

*The student:*

**Planning and Management**

- ☐ analyzes an existing piece of furniture or drawing to:
  - identify materials used in structural components
  - identify structural features, such as joints and fasteners
  - examine points of weakness
- ☐ produces or modifies the appropriate drawings

**Construction Techniques**

- ☐ constructs the product according to the design specifications
- ☐ meets stated standards for:
  - dimensioning
  - squaring
  - assembling
  - finishing

**Work Skills**

- ☐ follows directions with limited direction
- ☐ organizes work in an orderly manner
- ☐ selects and safely uses appropriate tools, materials and processes
- ☐ calculates and measures accurately
- ☐ works cooperatively with others in both structured and non-structured settings
- ☐ uses correct personal protective equipment
- ☐ follows proper lifting and handling procedures
- ☐ fulfills expected clean-up responsibilities
- ☐ stores and disposes of materials according to recommended procedures

**Project Presentation**

- ☐ describes the purpose of the project
- ☐ summarizes and reports on major events
- ☐ assesses design processes and production techniques
- ☐ suggests possible improvements to the design and construction processes
- ☐ identifies skills required of a competent furniture maker

**PERFORMANCE ASSESSMENT**

CRITERIA	STUDENT RATING				STANDARD	COMMENTS
Planning and Management	4	3	2	1	0	2
Construction Techniques	4	3	2	1	0	2
Work Skills	4	3	2	1	0	2
Project Presentation	4	3	2	1	0	2



## RESPONSE ASSESSMENT: COMMON FINISHES AND FINISHING TECHNIQUES Finishing and Refinishing: CON2150-1

### Module Learner Expectation

*The student will:*

- identify common finishes and finishing/refinishing techniques

### Standard

Response rating of 2

### Rating Scale

*The student:*

- 4 independently makes explanations and critical judgements based on a superior knowledge base and understanding of content and related issues.
- 3 makes explanation and comparisons of content using precise terminology. Requires little or no prompting.
- 2 applies knowledge of content to different situations using accurate terminology. May require some prompting.
- 1 uses simple recall to demonstrate basic knowledge and understanding of content. May require frequent prompting.
- 0 is unable to provide a suitable response at this time.

Sample Item(s)	Sample Response(s)
1. List the steps in preparing a surface for finishing.	<p><u>Surface Preparation:</u></p> <ul style="list-style-type: none"> <li>remove old finish if necessary</li> <li>remove mill and glue marks</li> <li>repair dents and wood defects</li> <li>bleach if necessary</li> <li>final sand</li> <li>prime if necessary.</li> </ul> <p><u>Applying a Finish</u></p> <ul style="list-style-type: none"> <li>select the final finish considering:               <ul style="list-style-type: none"> <li>planned use of the product</li> <li>available finishes and equipment</li> </ul> </li> <li>determine if a stain or filler is necessary</li> <li>clean the surface</li> <li>follow the prescribed procedure for staining, filling, sealing and final finishing.</li> </ul> <p><u>Common wood finishes include:</u></p> <ul style="list-style-type: none"> <li>varnish</li> <li>lacquer</li> <li>polyurethane</li> <li>paint</li> <li>oil.</li> </ul>
2. What are the steps in applying a finish?	
3. What types of finishes are commonly used to finish wood products?	
4. For a controlled product used in finishing, consult the appropriate MSDS to determine the hazards and recommended procedures for using the product.	
5. Explain the reason for disposing used finishing cloths in a covered metal container.	Spontaneous combustion may occur in rags that are stored together in open containers.

For additional items and responses refer to:

- Exploring Woodworking: Fundamentals of Technology.* Fred W. Zimmerman et. al., 1993. Text and Workbook.



## ACTIVITY ASSESSMENT: PRODUCT FINISHING

## Finishing and Refinishing: CON2150-2

### Module Learner Expectation

*The student will:*

- demonstrate appropriate refinishing/finishing techniques.

### Standard

Performance rating of 2 for each applicable task

### Rating Scale

*The student:*

- exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*
- meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*
- meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*

- meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*

- has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

### TASK PERFORMANCE CRITERIA

*The student:*

#### Planning and Management

- ☐ prepares self for task
- ☐ organizes and works in an orderly manner
- ☐ interprets and carries out instructions accurately
- ☐ plans and uses time effectively

#### Construction Techniques

- ☐ prepares surfaces for finish/refinishing as instructed
- ☐ selects the appropriate stain, filler, sealer and final finish
- ☐ follows prescribed procedures for finishing
- ☐ applies finish that is smooth, free of runs and dust particles

#### Use of Equipment and Materials

- ☐ selects and uses appropriate equipment/materials safely
- ☐ uses proper personal protective equipment
- ☐ follows proper lifting and handling procedures
- ☐ calculates and measures accurately
- ☐ minimizes waste of materials
- ☐ recognizes and controls potential health and safety hazards

### PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Planning and Management	4	3	2	1	0	2	
Construction Techniques	4	3	2	1	0	2	
Use of Equipment and Materials	4	3	2	1	0	2	



**PROJECT ASSESSMENT: WEB AND FACE FRAME CONSTRUCTION****Cabinetmaking 1 (Web & Face Frame): CON2160-1****Module Learner Expectations***The student will:*

- identify and describe the design features and processes used to construct a web and face frame product
- prepare a detailed material list and event sequence
- build a cabinet, using web and face frame construction techniques

**Standard**

Performance rating of 2 for each applicable task

**Rating Scale***The student:*

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*
- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*
- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*
- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*
- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

**TASK PERFORMANCE CRITERIA***The student:***Planning and Management**

- ☐ analyzes an existing web and face frame product or drawing to:
  - identify materials used in structural components
  - identify structural features, such as joints and fasteners
  - examine points of weakness
  - suggest possible design improvement
- ☐ produces or modifies the appropriate drawings
- ☐ prepares a detailed material list
- ☐ determines an appropriate sequence of events to construct the product in a safe manner

**Work Skills**

- ☐ follows instructions with limited direction
- ☐ organizes work in an orderly manner
- ☐ selects and safely uses appropriate tools, materials and processes
- ☐ calculates and measures accurately
- ☐ works cooperatively with others in both structured and non-structured settings
- ☐ uses correct personal protective equipment
- ☐ follows proper lifting and handling procedures
- ☐ fulfills expected clean-up responsibilities
- ☐ stores and disposes materials according to recommended procedures

**Construction Techniques**

- ☐ constructs the product according to the design specifications
- ☐ meets stated standards for:
  - dimensioning
  - squaring
  - assembling
  - finishing

**Project Presentation**

- ☐ describes the purpose of the project
- ☐ summarizes and reports on major events
- ☐ assesses design processes and production techniques
- ☐ suggests possible improvements to the design and construction processes

**PERFORMANCE ASSESSMENT**

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Planning and Management	4	3	2	1	0	2	
Construction Techniques	4	3	2	1	0	2	
Work Skills	4	3	2	1	0	2	
Project Presentation	4	3	2	1	0	2	



**PROJECT ASSESSMENT: DOOR AND DRAWER CONSTRUCTION**

**Cabinetmaking 2 (Door & Drawer): CON2170-1**

**Module Learner Expectations**

*The student will:*

- identify and describe common methods of designing and constructing cabinet doors and drawers
- apply cabinetmaking skills to plan and construct door/drawer components

**Standard**

Performance rating of 2 for each applicable task

**Rating Scale**

*The student:*

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*
- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*
- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*
- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*
- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

**TASK PERFORMANCE CRITERIA**

*The student:*

**Planning and Management**

- ☐ analyzes existing door and drawer products or drawings to:
  - determine materials used in structural components
  - identify structural features/
  - examine points of weakness
  - describe type of hardware
  - suggest possible design improvements
- ☐ produces or modifies an appropriate drawing for a drawer/door
- ☐ prepares a detailed material list
- ☐ determines an appropriate sequence of events to construct the product in a safe manner

**Construction Techniques**

- ☐ constructs the product according to the design specifications

**Construction Techniques (continued)**

- ☐ meets stated standards for:
  - dimensioning
  - squaring
  - assembling
  - finishing
- Work Skills**
  - ☐ follows instructions with limited direction
  - ☐ organizes work in an orderly manner
  - ☐ selects and safely uses appropriate tools, materials and processes
  - ☐ calculates and measures accurately
  - ☐ works cooperatively with others in both structured and non-structured settings
  - ☐ uses correct personal protective equipment
  - ☐ follows proper lifting and handling procedures
  - ☐ fulfills expected clean-up responsibilities
  - ☐ stores and disposes materials according to recommended procedures

**PERFORMANCE ASSESSMENT**

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Planning and Management	4 3 2 1 0	2	
Construction Techniques	4 3 2 1 0	2	
Work Skills	4 3 2 1 0	2	



# RESEARCH PROCESS: CAREER OPPORTUNITIES IN THE CABINETRY TRADE Cabinetmaking 2 (Door & Drawer): CON2170-2

## Module Learner Expectation

*The student will:*

- profile a trade or occupation within the cabinetmaking field

## Standard

Performance rating of 2 for each applicable task

## Rating Scale

*The student:*

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*
- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*

- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*

- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*

- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

## TASK PERFORMANCE CRITERIA

*The student:*

### Preparation and Planning

- ☐ sets goals and establishes steps to achieve them
- ☐ creates and adheres to useful timelines
- ☐ uses personal initiative to formulate questions and find answers
- ☐ plans and uses time effectively

### Information Gathering and Processing

- ☐ accesses a range of relevant school/community information resources
- ☐ uses a range of information-gathering techniques
- ☐ interprets, organizes and combines information into a logical sequence
- ☐ determines accuracy/currency/reliability of information sources

### Content

- ☐ identifies two or more occupations or trades related to cabinetry
- ☐ lists day-to-day duties of a worker or trades person
- ☐ describes overall working conditions
- ☐ assesses local employment opportunities
- ☐ identifies training programs and entry requirements

### Information Sharing

- ☐ demonstrates effective use of two or more communication media:  
*e.g., written, oral, audio-visual*
- ☐ communicates ideas in a logical sequence with sufficient supporting detail
- ☐ maintains acceptable grammatical and technical standards
- ☐ cites one or more basic information sources

## PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Preparation and Planning	4	3	2	1	0	2	
Information Gathering and Processing	4	3	2	1	0	2	
Content	4	3	2	1	0	2	
Information Sharing	4	3	2	1	0	2	



**RESPONSE ASSESSMENT: BENDING AND LAMINATING**

**Wood Forming: CON2180-1**

**Module Learner Expectation**

*The student will:*

- describe common wood forming techniques

**Standard**

Response rating of 2

**Rating Scale**

*The student:*

- 4 independently makes explanations and critical judgements based on a superior knowledge base and understanding of content and related issues.
- 3 makes explanation and comparisons of content using precise terminology. Requires little or no prompting.
- 2 applies knowledge of content to different situations using accurate terminology. May require some prompting.
- 1 uses simple recall to demonstrate basic knowledge and understanding of content. May require frequent prompting.
- 0 is unable to provide a suitable response at this time.

Sample Item(s)	Sample Response(s)
1. List and describe two processes used to condition wood for forming.	<p><u>Water Soaking:</u> The wood is soaked in water until it reaches a 12-20% water content level. The wood can then be slowly bent and held in shape over a form.</p> <p><u>Steaming:</u> Wood can also be steamed to cause it to soften (plasticize).</p>
2. Explain how a curved laminate is produced.	Curved laminated parts can be made by gluing several pieces of veneer together. The veneer strips are then clamped in a mold and held in place until the glue sets.

For additional sample items and responses refer to:

- *Cabinetmaking and Millwork*. John L. Feirer, 1988.



**PROJECT ASSESSMENT: WOOD FORMED PRODUCTS****Wood Forming: CON2180-2****Module Learner Expectations***The student will:*

- build or obtain the necessary molds and clamping devices to bend a piece of solid stock or wood laminate
- apply wood forming skills and techniques to make a product or component

**Standard**

Performance rating of 2 for each applicable task

**Rating Scale***The student:*

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*
- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*
- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*
- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*
- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

**Assessment Tools**

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**297****TASK PERFORMANCE CRITERIA***The student:***Planning and Management**

- ☐ defines project and material need
- ☐ conducts research to determine suitable forming process
- ☐ produces drawing of formed product and mold

**Construction Techniques**

- ☐ prepares the materials for bending following a prescribed set of procedures
- ☐ builds/selects the appropriate mold
- ☐ forms product and allows sufficient time for the adhesive to set
- ☐ trims and finishes the part

**Work Skills**

- ☐ follows instructions with limited direction
- ☐ organizes work in an orderly manner
- ☐ works cooperatively with others in both structured and non-structured settings
- ☐ uses tools and materials as directed
- ☐ minimizes waste of materials uses correct personal protective equipment
- ☐ follows proper lifting and handling procedures
- ☐ fulfills expected clean-up responsibilities
- ☐ stores and disposes materials according to recommended procedures

**Project Presentation**

- ☐ describes the purpose of the project
- ☐ summarizes and reports on major events
- ☐ assesses design processes and production techniques
- ☐ suggests possible improvements to the design and production processes

**PERFORMANCE ASSESSMENT**

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Planning and Management	4	3	2	1	0	2	
Construction Techniques	4	3	2	1	0	2	
Work Skills	4	3	2	1	0	2	
Project Presentation	4	3	2	1	0	2	



**PROJECT ASSESSMENT: BUILDING A PROTOTYPE****Product Development: CON2200-1****Module Learner Expectations**

*The student will:*

- list and describe the steps involved in developing a product for manufacturing
- apply designing and planning skills to assist in the development of a prototype

**Standard**

Performance rating of 2 for each applicable task

**Rating Scale**

*The student:*

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*
- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*
- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*
- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*
- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

**TASK PERFORMANCE CRITERIA**

*The student:*

**Planning and Management**

- ☐ defines project outcomes
- ☐ conducts research pertaining to the selection of ideas from a variety of sources
- ☐ generates and considers the suitability of a number of solutions to the problem
- ☐ selects an appropriate solution that meets project requirements
- ☐ identifies pictorial and multiviewed drawing requirements
- ☐ produces and accurately dimensions simple pictorial and multiviewed drawings where necessary
- ☐ uses appropriate drawing tools and/or software

**Construction Techniques**

- ☐ uses appropriate tools, materials and processes
- ☐ measures and fabricates accurately
- ☐ constructs the prototype according to the design specifications
- ☐ alters design according to market feedback
- ☐ alters production methods to maximize efficiency

**Work Skills**

- ☐ follows instructions with limited direction
- ☐ organizes work in an orderly manner
- ☐ works cooperatively with others in both structured and non-structured settings
- ☐ uses correct personal protective equipment
- ☐ follows proper lifting and handling procedures
- ☐ fulfills expected clean-up responsibilities
- ☐ stores and disposes materials according to recommended procedures

**Project Presentation**

- ☐ describes the purpose of the project
- ☐ summarizes and reports on major events
- ☐ assesses design processes and production techniques
- ☐ suggests possible improvements to the design and construction processes

**PERFORMANCE ASSESSMENT**

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Planning and Management	4	3	2	1	0	2	
Construction Techniques	4	3	2	1	0	2	
Work Skills	4	3	2	1	0	2	
Project Presentation	4	3	2	1	0	2	



**ILLUSTRATIVE EXAMPLE: PRODUCT APPRAISAL****Product Development: CON 2200-2**

ASSESSMENT CRITERIA	RATING			
	Very Good 3	Good 2	Fair 1	Poor 0
<b>Design Criteria:</b> <ul style="list-style-type: none"> <li>– meets the design specifications</li> <li>– is convenient to use/clean/service</li> <li>– is safe to use and be disposed of</li> <li>– can be recycled.</li> </ul>	<input type="checkbox"/>    	<input type="checkbox"/>    	<input type="checkbox"/>    	<input type="checkbox"/>    
<b>Production Criteria:</b> <ul style="list-style-type: none"> <li>– uses appropriate materials</li> <li>– components can be easily fabricated</li> <li>– can be easily assembled and finished</li> <li>– meets high standards of quality.</li> </ul>	<input type="checkbox"/>    	<input type="checkbox"/>    	<input type="checkbox"/>    	<input type="checkbox"/>    
<b>Marketing Criteria</b> <ul style="list-style-type: none"> <li>– appeals to potential customers</li> <li>– meets customer demand</li> <li>– is profitable</li> <li>– can be serviced within and existing network.</li> </ul>	<input type="checkbox"/>    	<input type="checkbox"/>    	<input type="checkbox"/>    	<input type="checkbox"/>    
<b>REFLECTIONS/COMMENTS</b>	Product has high potential for success ..... 30–36  Product has good potential for success ..... 24–29  Product has low potential for success ..... 12–23			



# RESEARCH PROCESS: CONCRETE FORMING, PLACING AND FINISHING Concrete Work (Structures & Finishes): CON3010-1

## Module Learner Expectations

### The student will:

- identify and describe concrete forming, placing and finishing techniques
- create a profile of a trade or occupation within the field of concrete work

### Standard

Performance rating of 3 or as stated for each applicable task

### Rating Scale

#### The student:

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals. Analyzes and provides effective client/customer services beyond expectations.*
- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort. Analyzes and provides effective client/customer services.*
- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals. Identifies and provides customer/client services.*
- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively. Provides a limited range of customer/client services.*
- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

## TASK PERFORMANCE CRITERIA

<b>The student:</b>	
<b>Preparation and Planning</b>	<b>Content (continued)</b>
<input type="checkbox"/> sets goals and establishes steps to achieve them	<input type="checkbox"/> lists and describes common tools and procedures used in placing, consolidating and finishing a concrete structure
<input type="checkbox"/> creates and adheres to useful timelines	<input type="checkbox"/> identifies working conditions associated with concrete work
<input type="checkbox"/> uses personal initiative to formulate questions and find answers	<input type="checkbox"/> determines employment opportunities
<input type="checkbox"/> plans and uses time effectively, prioritizing tasks on a consistent basis	<input type="checkbox"/> identifies post-secondary training institutions and entry requirements
<b>Information Gathering and Processing</b>	<input type="checkbox"/> investigates opportunities for a career advancement and self-employment
<input type="checkbox"/> accesses a range of relevant information sources and recognizes when additional information is required	<b>Collaboration and Teamwork</b>
<input type="checkbox"/> demonstrates resourcefulness in collecting data	<input type="checkbox"/> cooperates with group members
<input type="checkbox"/> interprets, organizes and combines information in creative and thoughtful ways	<input type="checkbox"/> shares work appropriately among group members
<input type="checkbox"/> records information accurately with appropriate supporting detail and using correct technical terms	<input type="checkbox"/> negotiates solutions to problems with sensitivity
<b>Content</b>	<b>Information Sharing</b>
<input type="checkbox"/> investigates common forming and reinforcing techniques	<input type="checkbox"/> demonstrates effective use of two or more communication media:
<input type="checkbox"/> examines the effects of the pressure of concrete on form work	<i>e.g., written, oral, audio-visual</i>
<input type="checkbox"/> explains the effect aggregate cement and water ratios have on the quality and strength of concrete	<input type="checkbox"/> communicates thoughts/feelings/ideas clearly to justify or challenge a position
	<input type="checkbox"/> maintains acceptable grammatical and technical standards
	<input type="checkbox"/> cites two or more relevant information sources

## PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Preparation and Planning	4 3 2 1 0	3	
Information Gathering and Processing	4 3 2 1 0	3	
Content	4 3 2 1 0	2	
Collaboration and Teamwork	4 3 2 1 0	3	
Information Sharing	4 3 2 1 0	3	

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**RESEARCH PROCESS: MASONRY MATERIALS AND FINISHES****Masonry Work (Structures & Finishes): CON3020-1****Module Learner Expectations***The student will:*

- identify and describe common types of masonry materials and finishes
- create a profile of a trade or occupation within the field of masonry work

**Standard**

Performance rating of 3 or as stated for each applicable task

**Rating Scale***The student:*

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals. Analyzes and provides effective client/customer services beyond expectations.*
- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort. Analyzes and provides effective client/customer services.*
- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals. Identifies and provides customer/client services.*
- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively. Provides a limited range of customer/client services.*
- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

**Assessment Tools**

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**TASK PERFORMANCE CRITERIA***The student:***Preparation and Planning**

- ☐ sets goals and establishes steps to achieve them
- ☐ creates and adheres to useful timelines
- ☐ uses personal initiative to formulate questions and find answers
- ☐ plans and uses time effectively, prioritizing tasks on a consistent basis

**Information Gathering and Processing**

- ☐ accesses a range of relevant information sources and recognizes when additional information is required
- ☐ demonstrates resourcefulness in collecting data
- ☐ interprets, organizes and combines information in creative and thoughtful ways
- ☐ records information accurately with appropriate supporting detail and using correct technical terms

**Content**

- ☐ describes and gives examples of masonry materials that are used in structural and facing applications
- ☐ explains how one or more masonry material is manufactured, applied/installed and finished

**Content (continued)**

- ☐ determines employment opportunities related to masonry work
- ☐ identifies working conditions
- ☐ identifies post-secondary training institutions and training requirements
- ☐ investigates opportunities for career advancement and self-employment

**Collaboration and Teamwork**

- ☐ cooperates with group members
- ☐ shares work appropriately among group members
- ☐ negotiates solutions to problems with sensitivity

**Information Sharing**

- ☐ demonstrates effective use of two or more communication media:  
*e.g., written, oral, audio-visual*
- ☐ communicates thoughts/feelings/ideas clearly to justify or challenge a position
- ☐ maintains acceptable grammatical and technical standards
- ☐ cites two or more relevant information sources

**PERFORMANCE ASSESSMENT**

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Preparation and Planning	4	3	2	1	0	3	
Information Gathering and Processing	4	3	2	1	0	3	
Content	4	3	2	1	0	2	
Collaboration and Teamwork	4	3	2	1	0	3	
Information Sharing	4	3	2	1	0	3	



## RESPONSE ASSESSMENT: INSULATING AND DRYWALLING

## Wall & Ceiling Finishing: CON3030-1

### Module Learner Expectations

#### The student will:

- describe the procedures related to the installation of insulation and vapour barrier to an exterior wall and ceiling
- identify and describe the health hazards and safety precautions associated with the use of insulating, drywalling and finishing materials

### Standard

Response rating of 3

### Rating Scale

#### The student:

- 4 independently makes explanations and critical judgements based on a superior knowledge base and understanding of content and related issues.
- 3 makes explanation and comparisons of content using precise terminology. Requires little or no prompting.
- 2 applies knowledge of content to different situations using accurate terminology. May require some prompting.
- 1 uses simple recall to demonstrate basic knowledge and understanding of content. May require frequent prompting.
- 0 is unable to provide a suitable response at this time.

Sample Item(s)	Sample Response(s)
1. What is the preferred thickness for polyethylene used as a vapour barrier?	6 mil is preferred although 4 mil is allowed. 6 mil is less likely to suffer damage during construction.
2. Which side of the insulation should be vapour barrier be installed.	On the warm side so that moisture will not build up inside the wall
3. Besides resistance to heat transfer, what other qualities should a good insulation have?	A good insulating material should be vermin proof, fire proof, moisture proof and resistant to physical change.
4. When rafters are used, what special care must be taken when insulating the ceiling at the wall line?	The insulation must be carried over the wall plate but not allowed to obstruct the throat opening.
5. Identify and provide an application for each of the three types of gypsum wall board materials.	<u>Moisture Resistant</u> used for shower walls and other wet areas  <u>Fire Guard</u> used wherever a fire hazard exists such as behind a stove or furnace or above heat vent pipes.  <u>Standard</u> For ordinary partitions where no special circumstances exist.
6. What are the health hazards associated with drywall and insulating materials?	Steps should be taken to protect one's self from breathing dust from drywall materials and fine insulation particles.

For additional items and questions refer to:

- Modern Carpentry*. William H. Wagner et. al., 1996.



**ACTIVITY ASSESSMENT: INSTALLING AND FINISHING DRYWALL****Wall & Ceiling Finishing: CON3030-2****Module Learner Expectation***The student will:*

- prepare, apply and finish a wall and ceiling surface

**Standard**

Performance rating of 3 or as stated for each applicable task

**Rating Scale***The student:*

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals. Analyzes and provides effective client/customer services beyond expectations.*

- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort. Analyzes and provides effective client/customer services.*

- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals. Identifies and provides customer/client services.*

- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively. Provides a limited range of customer/client services.*

- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

**TASK PERFORMANCE CRITERIA***The student:***Planning and Management**

- ☐ prepares self for task
- ☐ organizes and works in an orderly manner
- ☐ interprets and carries out instructions accurately
- ☐ plans and uses time in a logical sequence
- ☐ maintains a clean work area
- ☐ displays leadership in adhering to routine procedures
- ☐ attempts to solve problems prior to requesting help

**Construction Techniques**

- ☐ installs insulation, vapour barrier and drywall according to code
- ☐ tapes, fills and sands to the prescribed standard
- ☐ seals, paints and/or applies a wall covering

**Use of Equipment and Materials**

- ☐ selects and uses appropriate equipment/materials in a safe and efficient manner
- ☐ models the correct use of personal protective equipment (PPE)
- ☐ makes accurate calculations and measurements
- ☐ observes proper lifting and handling techniques
- ☐ fulfills expected clean-up and tool maintenance responsibilities
- ☐ identifies and corrects potential health and safety hazards

**Teamwork**

- ☐ cooperates with group members
- ☐ shares work appropriately among group members
- ☐ negotiates solutions to problems with sensitivity
- ☐ displays effective communication skills

**PERFORMANCE ASSESSMENT**

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Planning and Management	4	3	2	1	0	3	
Construction Techniques	4	3	2	1	0	2	
Use of Equipment and Materials	4	3	2	1	0	3	
Teamwork	4	3	2	1	0	3	



**RESEARCH PROCESS: STAIR CONSTRUCTION****Stair Construction: CON3040-1****Module Learner Expectations**

*The student will:*

- identify and describe different stair types, component parts and construction techniques
- interpret building code regulations pertaining to residential stair design

**Standard**

Performance rating of 3 or as stated for each applicable task

**Rating Scale**

*The student:*

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals. Analyzes and provides effective client/customer services beyond expectations.*
- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort. Analyzes and provides effective client/customer services.*
- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals. Identifies and provides customer/client services.*
- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively. Provides a limited range of customer/client services.*
- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

**TASK PERFORMANCE CRITERIA**

*The student:*

**Preparation and Planning**

- ☐ sets goals and establishes steps to achieve them
- ☐ creates and adheres to useful timelines
- ☐ uses personal initiative to formulate questions and find answers
- ☐ plans and uses time effectively, prioritizing tasks on a consistent basis

**Information Gathering and Processing**

- ☐ accesses a range of relevant information sources and recognizes when additional information is required
- ☐ demonstrates resourcefulness in collecting data
- ☐ interprets, organizes and combines information in creative and thoughtful ways
- ☐ records information accurately with appropriate supporting detail and using correct technical terms

**Content**

- ☐ investigates and describes four stair types; e.g.,
  - straight run
  - "L" shaped
  - "U" shaped
  - circular stair

**Content (continued)**

- ☐ identifies and describes four common stringer types and application of each; e.g.,
  - housed
  - semi-housed
  - cut out
  - stringer and cleat
- ☐ determines the specific code regulations for the minimum headroom, rise, run and railing specifications for a given stair
- ☐ identify five different stair components

**Collaboration and Teamwork**

- ☐ cooperates with group members
- ☐ shares work appropriately among group members
- ☐ negotiates solutions to problems with sensitivity

**Information Sharing**

- ☐ demonstrates effective use of two or more communication media  
*e.g., written, oral, audio-visual*
- ☐ communicates thoughts/feelings/ideas clearly to justify or challenge a position
- ☐ maintains acceptable grammatical and technical standards
- ☐ cites two or more relevant information sources

**PERFORMANCE ASSESSMENT**

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Preparation and Planning	4 3 2 1 0	3	
Information Gathering and Processing	4 3 2 1 0	3	
Content	4 3 2 1 0	2	
Collaboration and Teamwork	4 3 2 1 0	3	
Information Sharing	4 3 2 1 0	2	



**ACTIVITY ASSESSMENT: STAIR CONSTRUCTION****Stair Construction: CON3040-2****Module Learner Expectation**

*The student will:*

- design, lay out and construct a straight flight of stairs

**Standard**

Performance rating of 3 or as stated for each applicable task

**Rating Scale**

*The student:*

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals. Analyzes and provides effective client/customer services beyond expectations.*

- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort. Analyzes and provides effective client/customer services.*

- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals. Identifies and provides customer/client services.*

- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively. Provides a limited range of customer/client services.*

- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

**TASK PERFORMANCE CRITERIA**

*The student:*

**Planning and Management**

- ☐ prepares self for task
- ☐ organizes and works in an orderly manner
- ☐ interprets and carries out instructions accurately
- ☐ plans and uses time in a logical sequence
- ☐ maintains a clean work area
- ☐ displays leadership in adhering to routine procedures
- ☐ attempts to solve problems prior to requesting help

**Use of Equipment and Materials**

- ☐ selects and uses appropriate equipment/materials in a safe and efficient manner
- ☐ models the correct use of personal protective equipment (PPE)
- ☐ makes accurate calculations and measurements
- ☐ observes proper lifting and handling techniques
- ☐ fulfills clean-up and tool maintenance responsibilities
- ☐ identifies and corrects potential health and safety hazards

**Construction Techniques**

- ☐ builds or prefabricates an actual or model set of stairs according to the prescribed standard
- ☐ prepares a stair plan by determining:
  - type of stair
  - specifications; e.g., unit rise and run
  - finish details

**Teamwork**

- ☐ cooperates with group members
- ☐ shares work appropriately among group members
- ☐ negotiates solutions to problems with sensitivity
- ☐ displays effective communication skills

**PERFORMANCE ASSESSMENT**

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Planning and Management	4	3	2	1	0	3	
Construction Techniques	4	3	2	1	0	2	
Use of Equipment and Materials	4	3	2	1	0	3	
Teamwork	4	3	2	1	0	3	



**RESEARCH PROCESS: RAFTER CONSTRUCTION****Roof Structures 2 (Framing & Covering): CON3050-1****Module Learner Expectations**

*The student will:*

- identify and describe the design features of intersecting sloped roofs
- calculate the length of rafters, using ratio and proportion techniques

**Standard**

Performance rating of 3 for each applicable task

**Rating Scale**

*The student:*

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals. Analyzes and provides effective client/customer services beyond expectations.*
- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort. Analyzes and provides effective client/customer services.*
- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals. Identifies and provides customer/client services.*
- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively. Provides a limited range of customer/client services.*
- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

**TASK PERFORMANCE CRITERIA**

<b>The student:</b>	
<b>Preparation and Planning</b>	<b>Content (continued)</b>
<input type="checkbox"/> sets goals and establishes steps to achieve them	<input type="checkbox"/> describes the features and cuts required to make a: <ul style="list-style-type: none"> <li>• common rafter</li> <li>• hip and valley rafter</li> <li>• hip and valley jack rafter</li> </ul>
<input type="checkbox"/> creates and adheres to useful timelines	<input type="checkbox"/> from a set of drawings, determines
<input type="checkbox"/> uses personal initiative to formulate questions and find answers	<ul style="list-style-type: none"> <li>• roof slope</li> <li>• amount of overhang</li> <li>• length of a hip, valley and related jack rafter</li> </ul>
<input type="checkbox"/> plans and uses time effectively, prioritizing tasks on a consistent basis	
<b>Information Gathering and Processing</b>	<b>Collaboration and Teamwork</b>
<input type="checkbox"/> accesses a range of relevant information sources and recognizes when additional information is required	<input type="checkbox"/> cooperates with group members
<input type="checkbox"/> demonstrates resourcefulness in collecting data	<input type="checkbox"/> shares work appropriately among group members
<input type="checkbox"/> interprets, organizes and combines information in creative and thoughtful ways	<input type="checkbox"/> negotiates solutions to problems with sensitivity
<input type="checkbox"/> records information accurately with appropriate supporting detail and using correct technical terms	<b>Information Sharing</b>
<b>Content</b>	<input type="checkbox"/> demonstrates effective use of two or more communication media: <i>e.g., written, oral, audio-visual</i>
<input type="checkbox"/> investigates and describes the principal design features of an intersecting roof	<input type="checkbox"/> communicates thoughts/feelings/ideas clearly to justify or challenge a position
	<input type="checkbox"/> maintains acceptable grammatical and technical standards
	<input type="checkbox"/> cites two or more relevant information sources

**PERFORMANCE ASSESSMENT**

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Preparation and Planning	4	3	2	1	0	3	
	4	3	2	1	0		
Information Gathering and Processing	4	3	2	1	0	3	
	4	3	2	1	0		
Content	4	3	2	1	0	3	
Collaboration and Teamwork	4	3	2	1	0	3	
	4	3	2	1	0		
Information Sharing	4	3	2	1	0	3	



**ACTIVITY ASSESSMENT: RAFTER CUTTING AND ASSEMBLY****Roof Structures 2 (Framing & Covering): CON3050-2****Module Learner Expectation***The student will:*

- lay out, cut and assemble a set of rafters for a roof assembly

**Standard**

Performance rating of 3 for each applicable task

**Rating Scale***The student:*

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals. Analyzes and provides effective client/customer services beyond expectations.*

- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort. Analyzes and provides effective client/customer services.*

- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals. Identifies and provides customer/client services.*

- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively. Provides a limited range of customer/client services.*

- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

**TASK PERFORMANCE CRITERIA***The student:***Planning and Management**

- ☐ prepares self for task
- ☐ organizes and works in an orderly manner
- ☐ interprets and carries out instructions accurately
- ☐ plans and uses time in a logical sequence
- ☐ maintains a clean work area
- ☐ displays leadership in adhering to routine procedures
- ☐ attempts to solve problems prior to requesting help

**Use of Equipment and Materials**

- ☐ selects and uses appropriate equipment/materials in a safe and efficient manner
- ☐ models the correct use of personal protective equipment (PPE)
- ☐ makes accurate calculations and measurements
- ☐ observes proper lifting and handling techniques
- ☐ fulfills clean-up and tool maintenance responsibilities
- ☐ identifies and corrects potential health and safety hazards

**Construction Techniques**

- ☐ prepares a pattern from a given set of drawings
- ☐ cuts the appropriate number of rafters according to the prescribed pattern
- ☐ assemble rafters according to plan

**Teamwork**

- ☐ cooperates with group members
- ☐ shares work appropriately among group members
- ☐ negotiates solutions to problems with sensitivity
- ☐ displays effective communication skills

**PERFORMANCE ASSESSMENT**

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Planning and Management	4	3	2	1	0	3	
Construction Techniques	4	3	2	1	0	3	
Use of Equipment and Materials	4	3	2	1	0	3	
Project Presentation	4	3	2	1	0	3	



**RESEARCH PROCESS: INSTALLING INTERIOR DOORS AND TRIM****Doors and Trim: CON3060-1****Module Learner Expectations***The student will:*

- identify common types of doors, hardware and trim products
- create a profile of a trade or occupation within the finish carpentry field

**Standard**

Performance rating of 3 or as stated for each applicable task

**Rating Scale***The student:*

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals. Analyzes and provides effective client/customer services beyond expectations.*
- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort. Analyzes and provides effective client/customer services.*
- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals. Identifies and provides customer/client services.*
- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively. Provides a limited range of customer/client services.*
- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

**TASK PERFORMANCE CRITERIA***The student:***Preparation and Planning**

- ☐ sets goals and establishes steps to achieve them
- ☐ creates and adheres to useful timelines
- ☐ uses personal initiative to formulate questions and find answers
- ☐ plans and uses time effectively, prioritizing tasks on a consistent basis

**Information Gathering and Processing**

- ☐ accesses a range of relevant information sources and recognizes when additional information is required
- ☐ demonstrates resourcefulness in collecting data
- ☐ interprets, organizes and combines information in creative and thoughtful ways
- ☐ records information accurately with appropriate supporting detail and using correct technical terms

**Content**

- ☐ lists and describes the common interior doors found in residential construction
- ☐ explains how one determines whether a door has a right hand or left hand swing
- ☐ investigates and describes the principal types of trim used in residential construction

**Content (continued)**

- ☐ identifies the common wood joints used when installing trim products
- ☐ provides a diagram of a passage door lock and labels its parts
- ☐ describes a trade or related occupation
- ☐ investigates the career opportunities and training requirements for a finish carpenter

**Collaboration and Teamwork**

- ☐ cooperates with group members
- ☐ shares work appropriately among group members
- ☐ negotiates solutions to problems with sensitivity

**Information Sharing**

- ☐ demonstrates effective use of two or more communication media  
*e.g., written, oral, audio-visual*
- ☐ communicates thoughts/feelings/ideas clearly to justify or challenge a position
- ☐ maintains acceptable grammatical and technical standards
- ☐ cites two or more relevant information sources

**PERFORMANCE ASSESSMENT**

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Preparation and Planning	4 3 2 1 0	3	
Information Gathering and Processing	4 3 2 1 0	3	
Content	4 3 2 1 0	2	
Collaboration and Teamwork	4 3 2 1 0	3	
Information Sharing	4 3 2 1 0	3	



## TASK PERFORMANCE CRITERIA

- identify and describe common types of residential, institutional and commercial floor coverings
- create a profile of a trade or occupation within the covering field

## Performance rating of 3 or as stated for each applicable task

**The student:**

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals. Analyzes and provides effective client/customer services beyond expectations.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort. Analyzes and provides effective client/customer services.*

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0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

## TASK PERFORMANCE CRITERIA

## PERFORMANCE ASSESSMENT

## PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Preparation and Planning	4 3 2 1 0	3	
Information Gathering and Processing	4 3 2 1 0	3	
Content	4 3 2 1 0	2	
Collaboration and Teamwork	4 3 2 1 0	3	
Information Sharing	4 3 2 1 0	3	







**RESEARCH PROCESS: MANAGEMENT PRINCIPLES AND PRACTICES****Site Management: CON3110-1****Module Learner Expectation**

*The student will:*

- identify and describe the key elements of project management related to commercial and residential construction
- outline the roles and responsibilities of the principal players on a construction project
- apply site management theories and practices to create a management plan for a construction project

**Standard**

Performance rating of 3 or as stated for each applicable task

**Rating Scale**

*The student:*

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals. Analyzes and provides effective client/customer services beyond expectations.*
- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort. Analyzes and provides effective client/customer services.*
- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals. Identifies and provides customer/client services.*
- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively. Provides a limited range of customer/client services.*
- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

**TASK PERFORMANCE APPRAISAL**

*The student:*

**Preparation and Planning**

- ☐ sets clear goals and establishes steps to achieve them
- ☐ creates and adheres to detailed timelines
- ☐ uses personal initiative to formulate questions and find answers
- ☐ plans and uses time effectively, prioritizing tasks on a consistent basis

**Information Gathering and Processing**

- ☐ accesses a range of relevant information sources and recognizes when additional information is required
- ☐ demonstrates resourcefulness in collecting data
- ☐ interprets, organizes and combines information in creative and thoughtful ways
- ☐ records information accurately with appropriate supporting detail and using correct technical terms

**Content**

- ☐ identifies and describes principal tasks related to the following management phases:
  - planning
  - scheduling
  - implementing
  - controlling

**Content (continued)**

- ☐ provides accurate descriptions of the role and responsibilities of a project manager in relation to other key players
- ☐ outlines and compares two different scheduling techniques used on construction projects
- ☐ creates a work schedule

**Collaboration and Teamwork**

- ☐ cooperates with group members
- ☐ shares work appropriately among group members
- ☐ negotiates solutions to problems with sensitivity
- ☐ displays effective communication and leadership skills

**Information Sharing**

- ☐ demonstrates effective use of a variety of communication media:  
*e.g., written, oral, audio-visual*
- ☐ communicates thoughts/feelings/ideas clearly to justify or challenge a position
- ☐ maintains acceptable grammatical and technical standards
- ☐ gives evidence of adequate information gathering by citing relevant information sources

**PERFORMANCE ASSESSMENT**

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Preparation and Planning	4	3	2	1	0	3	
	4	3	2	1	0		
Information Gathering and Processing	4	3	2	1	0	3	
	4	3	2	1	0		
Content	4	3	2	1	0	2	
	4	3	2	1	0		
Collaboration and Teamwork	4	3	2	1	0	3	
	4	3	2	1	0		
Information Sharing	4	3	2	1	0	3	
	4	3	2	1	0		



**PROJECT ASSESSMENT: LEG-AND-RAIL CONSTRUCTION****Furniture Making 3 (Leg & Rail): CON3130-1****Module Learner Expectations***The student will:*

- identify and describe the design and joinery features of a typical leg-and-rail piece of furniture
- apply drawing and estimating skills to prepare a shop drawing, a detailed material list and cost estimate
- plan and build a piece of furniture using leg-and-rail construction techniques

**Standard**

Performance rating of 3 for each applicable task

**Rating Scale***The student:*

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals. Analyzes and provides effective client/customer services beyond expectations.*
- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort. Analyzes and provides effective client/customer services.*
- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals. Identifies and provides customer/client services.*
- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively. Provides a limited range of customer/client services.*
- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

G.80/ Construction Technologies, CTS

(1997)

**TASK PERFORMANCE CRITERIA***The student:***Planning and Management**

- ☐ analyzes an existing leg-and-rail product or drawing to:
- determine materials used in structural components
- identify and describe structural features
- predict points of weakness
- identify and describe hardware requirements
- suggest possible design improvements
- ☐ produces or modifies an appropriate set of drawings for a leg-and-rail product based on research and client need
- ☐ prepares a detailed list of materials and cost estimate

**Construction Techniques**

- ☐ identifies preferred tool requirements
- ☐ calculates and measures accurately to minimize costs
- ☐ constructs the product according to the design specifications
- ☐ is sensitive to a variety of feedback mechanisms and alters plans accordingly

**Construction Techniques (continued)**

- ☐ meets stated standards for:
  - dimensioning
  - squaring
  - assembling
  - finishing
- Work Skills**
- ☐ accurately follows instructions
- ☐ creates and adheres to detailed timeline; makes efficient use of time
- ☐ works cooperatively with others, shares work appropriately among group members and negotiates with sensitivity, solutions to problem
- ☐ fulfills clean-up and tool maintenance responsibilities
- ☐ establishes and follows personal and environmental health and safety procedures
- ☐ determines recommended health and safety practices to store and/or dispose of materials

**Project Presentation**

- ☐ describes the purpose and scope of the project
- ☐ summarizes and reports on major events
- ☐ assesses design processes and construction techniques
- ☐ makes recommendations to improve product quality and productivity

**PERFORMANCE ASSESSMENT**

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Planning and Management	4	3	2	1	0	3	
Construction Techniques	4	3	2	1	0	3	
Work Skills	4	3	2	1	0	3	
Project Presentation	4	3	2	1	0	3	

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## RESPONSE ASSESSMENT: SURFACE ENHANCEMENTS

## Furniture Making 4 (Surface Enhancement): CON3140-1

### Module Learner Expectations

*The student will:*

- identify and describe common methods of matching wood veneer
- differentiate between inlay, marquetry and carving techniques

### Standard

Response rating of 3

### Rating Scale

*The student:*

- 4 independently makes explanations and critical judgements based on a superior knowledge base and understanding of content and related issues.
- 3 makes explanation and comparisons of content using precise terminology. Requires little or no prompting.
- 2 applies knowledge of content to different situations using accurate terminology. May require some prompting.
- 1 uses simple recall to demonstrate basic knowledge and understanding of content. May require frequent prompting.
- 0 is unable to provide a suitable response at this time.

Sample Item(s)	Sample Response(s)
<ol style="list-style-type: none"> <li>1. From pictures or drawings of veneer matching techniques, identify and describe the following: <ul style="list-style-type: none"> <li>• book</li> <li>• slip</li> <li>• diamond</li> <li>• checker board.</li> </ul> </li> <li>2. Explain how a diamond match is prepared.</li> <li>3. List and describe three different furniture enhancement techniques.</li> </ol>	<p>If a diamond match is required, the four pieces of veneer are cut on an angle from the same piece stripped grain veneer.</p> <p><u>Inlay</u> An inlay pattern is achieved when a thin strip of a rare wood is set into the surface of solid wood or other veneer.</p> <p><u>Marquetry</u> Marquetry is the technique that is used to produce a design or picture from a variety of different veneers.</p> <p><u>Carving</u> Ornamental designs on wood products are cut into the wood surface using special hand tools and/or power tools.</p>

For additional sample items and responses refer to:

- *Cabinetmaking and Millwork*. John L. Feirer, 1988.



**PROJECT ASSESSMENT: REPAIRING/RESTORING FURNITURE****Furniture Repair: CON3150-1****Module Learner Expectations***The student will:*

- assess the condition of a piece of furniture to determine whether it can be economically repaired or restored
- prepare a repair/restoration plan and cost estimate
- repair/restore a piece of furniture

**Standard**

Performance rating of 3 for each applicable task

**Rating Scale***The student:*

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals. Analyzes and provides effective client/customer services beyond expectations.*

- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort. Analyzes and provides effective client/customer services.*

- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals. Identifies and provides customer/client services.*

- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively. Provides a limited range of customer/client services.*

- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

**TASK PERFORMANCE CRITERIA***The student:***Planning and Management**

- ☐ analyzes an existing piece of furniture to:
  - determine materials and finishes
  - identify structural features
  - predict areas of weakness and/or disrepair
- ☐ estimates the cost of repair from the analysis
- ☐ develops a repair/restoration plan that:
  - identifies materials and tools required
  - specialized skills required
  - sequence of events to be followed

**Repair Processes**

- ☐ identifies preferred tool requirements
- ☐ disassembles and removes old glue and finish
- ☐ repairs surfaces or joints
- ☐ reassembles using appropriate fasteners and adhesives
- ☐ finishes to meet or exceed the original standard

**Work Skills**

- ☐ accurately follows instructions
- ☐ creates and adheres to detailed timeline; makes efficient use of time
- ☐ works cooperatively with others, shares work appropriately among group members and negotiates with sensitivity, solutions to problem
- ☐ fulfills clean-up and tool maintenance responsibilities
- ☐ establishes and follows personal and environmental health and safety procedures
- ☐ determines recommended health and safety practices to store and/or dispose of materials

**Project Presentation**

- ☐ describes the purpose and scope of the project
- ☐ summarizes and reports on major events
- ☐ assesses design processes and construction techniques
- ☐ makes recommendations to improve product quality and productivity

**PERFORMANCE ASSESSMENT**

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Planning and Management	4	3	2	1	0	3	
Construction Techniques	4	3	2	1	0	3	
Work Skills	4	3	2	1	0	3	
Project Presentation	4	3	2	1	0	3	



## Module Learner Expectations

*The student will:*

- identify and describe common types of cabinet/countertops and installation procedures.
- identify and describe a suitable edge treatment for a given application

## Standard

Performance rating of 3 for each applicable task

### Rating Scale

**The student:**

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals. Analyzes and provides effective client/customer services beyond expectations.*
- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort. Analyzes and provides effective client/customer services.*
- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals. Identifies and provides customer/client services.*
- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively. Provides a limited range of customer/client services.*
- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

## TASK PERFORMANCE CRITERIA

*The student*

**Preparation and Planning**

- ☐ sets goals and describes steps to achieve them
- ☐ uses personal initiative to formulate questions and find answers
- ☐ accesses a range of relevant information sources and recognizes when additional information is required
- ☐ interprets, organizes and combines information in creative and thoughtful ways
- ☐ records information accurately with appropriate technical terms and supporting detail
- ☐ plans and uses time effectively, prioritizing tasks on a consistent basis

**Content**

- ☐ describes current cabinet/counter top materials used in cabinet making and residential construction
- ☐ illustrates methods used to achieve an appropriate edge treatment
- ☐ identifies various adhesives and safe methods of handling and storage

**Content (continued)**

- ☐ identifies and describes common techniques used to attach counter tops with an emphasis on faster concealment
- ☐ produces two sample counter top surfaces and edge treatment

**Presenting/Reporting**

- ☐ demonstrates effective use of one or more communication media:  
e.g., Written: *spelling, punctuation, grammar*  
*basic format*  
*Oral* *voice projection, body language*  
*Audio-visual* *techniques, tools, clarity, speed and pacing*
- ☐ maintains acceptable grammatical and technical standards through proofreading and editing
- ☐ provides an introduction that describes the purpose and scope of the project
- ☐ communicates thoughts/feelings/ideas clearly to justify or challenge a position
- ☐ gives evidence of adequate research through a reference list

## PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Preparation and Planning	4	3	2	1	0	3	
Content	4	3	2	1	0	3	
Presenting/ Reporting	4	3	2	1	0	3	



**PRESENTATIONS/REPORTS: PLANNING FOR EFFICIENCY****Production Planning: CON3190-1****Module Learner Expectations***The student will:*

- identify the characteristics of an efficient production system
- analyze a product to determine the necessary production processes and tools
- create a production flow chart and/or facility layout

**Standard**

Performance rating of 3 or as stated for each applicable task

**Rating Scale***The student:*

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals. Analyzes and provides effective client/customer services beyond expectations.*
- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort. Analyzes and provides effective client/customer services.*
- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals. Identifies and provides customer/client services.*
- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively. Provides a limited range of customer/client services.*
- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

**TASK PERFORMANCE CRITERIA**

<i>The student</i>					
<b>Preparation and Planning</b>					
<input type="checkbox"/> sets goals and describes steps to achieve them					
<input type="checkbox"/> uses personal initiative to formulate questions and find answers					
<input type="checkbox"/> accesses a range of relevant information sources and recognizes when additional information is required					
<input type="checkbox"/> interprets, organizes and combines information in creative and thoughtful ways					
<input type="checkbox"/> records information accurately with appropriate technical terms and supporting detail					
<input type="checkbox"/> plans and uses time effectively, prioritizing tasks on a consistent basis					
<b>Content</b>					
<input type="checkbox"/> provides examples of efficient production systems					
<input type="checkbox"/> links production efficiency to time, material and cost savings					
<input type="checkbox"/> identifies inefficiencies related to:					
• poor inventory control					
• poor quality control					
• line breakdown					
• facility layout					
• working conditions					
<b>Content (continued)</b>					
<input type="checkbox"/> lists and describes processes required to produce a given product					
<input type="checkbox"/> organizes production flow charts					
<input type="checkbox"/> evaluates it on the basis of:					
• visible bottle necks					
• need to back track					
• material and product flow					
<b>Presenting/Reporting</b>					
<input type="checkbox"/> demonstrates effective use of one or more communication media:					
e.g., <u>Written</u> : <i>spelling, punctuation, grammar basic format</i>					
<u>Oral</u> : <i>voice projection, body language</i>					
<u>Audio-visual</u> : <i>techniques, tools, clarity, speed and pacing</i>					
<input type="checkbox"/> maintains acceptable grammatical and technical standards through proofreading and editing					
<input type="checkbox"/> provides an introduction that describes the purpose and scope of the project					
<input type="checkbox"/> communicates thoughts/feelings/ideas clearly to justify or challenge a position					
<input type="checkbox"/> gives evidence of adequate research through a reference list					

**PERFORMANCE ASSESSMENT**

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Preparation and Planning	4	3	2	1	0	3	
Content	4	3	2	1	0	2	
Presenting/Reporting	4	3	2	1	0	3	



**PRESENTATIONS/REPORTS: QUALITY MANAGEMENT****Production Management: CON3200-1****Module Learner Expectations**

*The student will:*

- describe effective production management strategies
- develop a system to manage and schedule work and to control materials and completed products
- use effective management skills to operate an efficient production system

**Standard**

Performance rating of 3 or as stated for each applicable task

**Rating Scale**

*The student:*

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals. Analyzes and provides effective client/customer services beyond expectations.*
- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort. Analyzes and provides effective client/customer services.*
- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals. Identifies and provides customer/client services.*
- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively. Provides a limited range of customer/client services.*
- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

**TASK PERFORMANCE CRITERIA**

<i>The student</i>					
<b>Preparation and Planning</b>	<b>Content (continued)</b>				
<input type="checkbox"/> sets goals and describes steps to achieve them	<input type="checkbox"/> designs and implements a plan to:				
<input type="checkbox"/> uses personal initiative to formulate questions and find answers	• schedule work				
<input type="checkbox"/> accesses a range of relevant information sources and recognizes when additional information is required	• distribute materials				
<input type="checkbox"/> interprets, organizes and combines information in creative and thoughtful ways	• store/distribute products				
<input type="checkbox"/> records information accurately with appropriate technical terms and supporting detail	<input type="checkbox"/> keeps records of a production run				
<input type="checkbox"/> plans and uses time effectively, prioritizing tasks on a consistent basis	<input type="checkbox"/> describes methods to improve management skills				
<b>Content</b>	<b>Presenting/Reporting</b>				
<input type="checkbox"/> outlines principles of a quality management system	<input type="checkbox"/> demonstrates effective use of one or more communication media:				
<input type="checkbox"/> describes role of customers, employees and managers in developing a quality system	<i>e.g., Written: spelling, punctuation, grammar basic format</i>				
<input type="checkbox"/> discusses the role of collaboration and teamwork to improve quality	<i>Oral: voice projection, body language</i>				
<input type="checkbox"/> identifies and describes organizational systems such as a "PERT" chart	<i>Audio-visual: techniques, tools, clarity, speed and pacing</i>				
	<input type="checkbox"/> maintains acceptable grammatical and technical standards through proofreading and editing				
	<input type="checkbox"/> provides an introduction that describes the purpose and scope of the project				
	<input type="checkbox"/> communicates thoughts/feelings/ideas clearly to justify or challenge a position				
	<input type="checkbox"/> gives evidence of adequate research through a reference list				

**PERFORMANCE ASSESSMENT**

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Preparation and Planning	4	3	2	1	0	1	
Content	4	3	2	1	0	1	
Presenting/ Reporting	4	3	2	1	0	1	



## RESPONSE ASSESSMENT: FRAMING SYSTEMS

## Framing Systems 2 (Floor, Wall & Ceiling): CON3210-1

### Module Learner Expectation

#### The student will:

- compare conventional and engineered framing systems and components

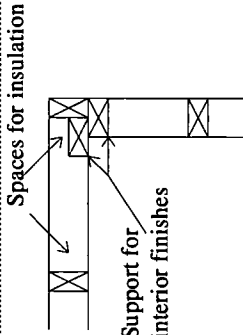
#### Standard:

Response rating of 3

#### Rating Scale

#### The student:

- 4 independently makes explanations and critical judgements based on a superior knowledge base and understanding of content and related issues.
- 3 makes explanation and comparisons of content using precise terminology. Requires little or no prompting.
- 2 applies knowledge of content to different situations using accurate terminology. May require some prompting.
- 1 uses simple recall to demonstrate basic knowledge and understanding of content. May require frequent prompting.
- 0 is unable to provide a suitable response at this time.

Sample Item(s)	Sample Response(s)
1. Most framed structures have some form of bracing to provide restraint from lateral forces. Describe one or more techniques that may be used where non-structural materials are used as sheathing.	Bracing can be achieved by let-in bracing where the outside faces are notched at each corner to receive a 1" x 4" board at a 45° angle set flush with each stud face  or  By fitting 2" lumber between each stud at an angle of 45° at each corner  or  Applying galvanized steel T-bracing at a 45° angle to the outside faces of the studs at each corner.
2. Compare the advantages of open and solid web trusses over conventional floor and ceiling framing techniques.	Open Web: <ul style="list-style-type: none"> <li>provides for long, clear spans</li> <li>lighter and straighter than solid lumber</li> <li>reduces transmission of sound</li> <li>no cutting required to install plumbing, heating and electrical system</li> </ul> Solid Web <ul style="list-style-type: none"> <li>not prone to shrink</li> <li>lighter and straighter than solid lumber</li> <li>wider nailing and bearing surfaces</li> <li>ductwork, pipes and wire can pass through web.</li> </ul>
3. Draw a typical corner configuration in stud framing that provides support for interior finishes and the greatest amount of protection from heat loss.	

For additional items and responses refer to:

- Modern Carpentry*. William H. Wagner et. al., 1966.



**CONSTRUCTION ACTIVITY: FRAMING****Framing Systems 2 (Floor, Wall & Ceiling): CON3210-2****Module Learner Expectations**

*The student will:*

- apply print-reading and estimating principles to prepare a material list and cost estimate for a structure that incorporates conventional and/or engineered framing components
- demonstrate advanced framing layout and assembly skills

**Standard:**

Performance rating of 3 for each applicable task

**Rating Scale**

*The student:*

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards.*
- 3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent.*
- 2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent.*
- 1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent.*
- 0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

**TASK PERFORMANCE CRITERIA**

*The student:*

**Planning and Management**

- ☐ prepares self for task
- ☐ organizes and works in an orderly manner
- ☐ interprets and carries out instructions accurately
- ☐ plans and uses time efficiently
- ☐ displays leadership in adhering to routine procedures
- ☐ attempts to solve problems prior to requesting help
- ☐ interprets floor, wall and ceiling prints
- ☐ accurately prepares a material list and cost estimate

**Use of Equipment and Materials**

- ☐ selects and uses appropriate equipment/materials in a safe and efficient manner
- ☐ models the correct use of PPE
- ☐ makes accurate calculations and measurements
- ☐ uses materials efficiently
- ☐ observes proper lifting and handling techniques
- ☐ fulfills clean-up and tool maintenance responsibilities
- ☐ identifies and corrects potential health and safety hazards

**Construction Technique**

- ☐ cuts and lays out components according to plan
- ☐ assembles and fastens components in keeping with accepted framing practice
- ☐ accurately measures squares and levels components

**Teamwork**

- ☐ demonstrates leadership skills
- ☐ cooperates with group members
- ☐ shares work appropriately among group members
- ☐ negotiates solutions to problems with sensitivity
- ☐ displays effective communication skills

**PERFORMANCE ASSESSMENT**

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Planning and Management	4	3	2	1	0	3	
Construction Techniques	4	3	2	1	0	3	
Use of Equipment and Materials	4	3	2	1	0	3	
Teamwork	4	3	2	1	0	3	



# EQUIPMENT CHECKLIST: DRILL PRESS

## CONEQUIP-1

**STANDARD:** all procedures to be performed correctly.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

### \* SET-UP PROCEDURES

*The student:*

- ☐ operates the equipment only with the teacher's permission
- ☐ removes/confines loose apparel and long hair
- ☐ wears the proper personal protective equipment
- ☐ selects and mounts the proper drill bit or accessory
- ☐ removes the key from the chuck
- ☐ adjusts the machine to the correct speed
- ☐ checks the condition and position of all guards
- ☐ mounts the work securely in the proper vise or clamp
- ☐ adjusts the depth stop to the correct depth
- ☐ centres punches metal parts prior to drilling
- ☐ checks drill bit for straightness
- ☐ positions the work piece.

### \* OPERATING PROCEDURES

*The student:*

- ☐ checks drill bit alignment and depth of cut
- ☐ applies even pressure when drilling
- ☐ raises the drill bit occasionally to clear cuttings
- ☐ uses cutting fluids if necessary
- ☐ drills a pilot hole for larger holes
- ☐ uses a V-block to hold round stock
- ☐ removes cuttings with a brush
- ☐ keeps floor free from scrap materials.

### \* SHUT-DOWN PROCEDURES

*The student:*

- ☐ removes and carefully stores work pieces
- ☐ returns tools and accessories to their proper location
- ☐ cleans the equipment and work area
- ☐ returns equipment to original state.

\* Procedures may differ according to each manufacturer's recommendations.



**EQUIPMENT CHECKLIST: BANDSAW****CONEQUIP-2****STANDARD:** all procedures to be performed correctly.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**\* SET-UP PROCEDURES***The student:*

- ☐ requests permission to use equipment before work begins
- ☐ removes/confines loose apparel and long hair
- ☐ wears the proper personal protective equipment
- ☐ checks the condition of the blade and blade guides
- ☐ adjusts blade guides to the correct height – 3 mm or 1/8" – above work.

**\* OPERATING PROCEDURES***The student:*

- ☐ guides the work slowly; does not force the work
- ☐ avoids backing out from cuts other than making relief cuts
- ☐ does not attempt to cut smaller radius than the blade will allow
- ☐ uses V block to cut cylindrical stock
- ☐ does not place fingers or hands in line with the blade
- ☐ uses a push stick where necessary
- ☐ applies brake to stop blade
- ☐ allows the machine to come to a complete stop when removing the work piece, cleaning or making adjustments
- ☐ maintains a 100 mm margin of safety between fingers and blade.

**\* SHUT-DOWN PROCEDURES***The student:*

- ☐ returns tools and accessories to their proper location
- ☐ cleans up equipment and work area
- ☐ lowers blade guard to table.

**\* Procedures may differ according to each manufacturer's recommendations.**



**EQUIPMENT CHECKLIST: WOOD LATHE**

**Turning Operations: CONEQUIP-3**

**STANDARD:** all procedures to be performed correctly.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**\* SET-UP PROCEDURES**

*The student:*

- ☐ requests permission to use equipment before work begins
- ☐ removes/confines loose apparel and long hair
- ☐ wears the proper personal protective equipment
- ☐ makes sure all guards are in place and operating correctly
- ☐ securely mounts work between centres or to the face plate
- ☐ adjusts tool rest to the correct height and distance from the work piece
- ☐ adjusts equipment to operate at the correct speed
- ☐ makes provision for dust control
- ☐ checks stock for balance and soundness.

**\* OPERATING PROCEDURES**

*The student:*

- ☐ rotates spindle by hand to check clearance before starting
- ☐ stands to one side when starting the lathe
- ☐ selects the appropriate cutting tools
- ☐ holds the cutting tools securely and at the proper angles to the work
- ☐ frequently readjusts tool rest to maintain correct speed and distance to work piece
- ☐ allows work piece to fully stop before adjusting the tool rest or measuring the work piece
- ☐ removes tool rest before sanding.

**\* SHUT-DOWN PROCEDURES**

*The student:*

- ☐ removes and carefully stores work piece
- ☐ returns tools and accessories to their proper location
- ☐ cleans up equipment and the work area
- ☐ returns adjustments to original state.

**\* Procedures may differ according to each manufacturer's recommendations.**



**EQUIPMENT CHECKLIST: TABLE SAW****CONEQUIP-4****STANDARD:** all procedures to be performed correctly.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**\* SET-UP PROCEDURES***The student:*

- ☐ requests permission to use equipment before work begins
- ☐ removes/confines loose apparel and long hair
- ☐ wears the proper personal protective equipment
- ☐ makes sure power supply to the saw is off before changing blade configuration
- ☐ checks/installs proper blade
- ☐ sets blade to proper height – 3 mm or 1/8" above the work piece
- ☐ adjusts fence and/or miter gauge
- ☐ checks to see that all guards and other safety devices are in place and functioning.

**\* OPERATING PROCEDURES***The student:*

- ☐ uses rip fence for ripping and miter gauge for crosscutting
- ☐ uses a push stick when hands come within 150 mm or 6" of the blade
- ☐ stands to one side of the blade
- ☐ measures off the blade only after it has come to a complete stop
- ☐ allows the blade to come to a complete stop before waste stock is removed from the table
- ☐ keeps floor free from scrap materials.

**\* SHUT-DOWN PROCEDURES***The student:*

- ☐ returns tools and accessories to their proper location
- ☐ cleans up equipment and work area
- ☐ lowers blade and returns the miter gauge and blade to 90°.

**\* Procedures may differ according to each manufacturer's recommendations.**



**EQUIPMENT CHECKLIST: SURFACE PLANER****CONEQUIP-5****STANDARD:** all procedures to be performed correctly.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**\* SET-UP PROCEDURES***The student:*

- ☐ requests permission to use equipment before work begins
- ☐ removes/confines loose apparel and long hair
- ☐ wears the proper personal protective equipment
- ☐ clears the table of any scraps
- ☐ sees that the work piece is free of loose knots, nails, dirt and finish materials
- ☐ determines grain and feed direction
- ☐ adjusts depth of cut, normal 2mm or 1/16".

**\* OPERATING PROCEDURES***The student:*

- ☐ planes in the direction of the grain
- ☐ does not plane stock less than 300 mm or 12" long, or less than 6 mm or 1/4" thick.
- ☐ uses a follower stick if required for short stock
- ☐ stands to one side of the stock when planing
- ☐ shuts power off before attempting to remove stock that has become stuck
- ☐ keeps area around equipment free of scrap.

**\* SHUT-DOWN PROCEDURES***The student:*

- ☐ cleans up equipment and work area
- ☐ returns adjustments to original state.

**\* Procedures may differ according to each manufacturer's recommendations.**



**EQUIPMENT CHECKLIST: JOINTER****CONEQUIP-6****STANDARD:** all procedures to be performed correctly.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**\* SET-UP PROCEDURES***The student:*

- ☐ requests permission to use equipment before work begins
- ☐ removes/confines loose apparel and long hair
- ☐ wears the proper personal protective equipment
- ☐ checks all adjustments and control locks with power off
- ☐ checks condition and operation of guards
- ☐ determines condition of material direction of grain
- ☐ adjusts depth of cut to 2 mm to 3 mm or 1/16" to 1/8".

**\* OPERATING PROCEDURES***The student:*

- ☐ joints in direction of grain
- ☐ does not joint stock less than 300 mm or 12" in length and 12 mm or 1/2" in thickness
- ☐ uses push block for flat work
- ☐ keeps fingers and hands away from cutting knives
- ☐ keeps area clean and floor free of scrap materials.

**\* SHUT-DOWN PROCEDURES***The student:*

- ☐ makes sure the machine has come to a complete stop prior to cleaning
- ☐ returns adjustments to original state.

**\* Procedures may differ according to each manufacturer's recommendations.**



# CONSTRUCTION TECHNOLOGIES

## SECTION H: LINKAGES/TRANSITIONS

This section of the Guide has been designed to provide an overview of linkages and transitions of CTS modules with a number of organizations. The charts and information presented in this section will assist CTS students and teachers in understanding the potential application of CTS modules as students move into the workplace.

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## LINKAGES/TRANSITIONS

There are many opportunities for students in Construction Technologies to build linkages among CTS strands and across other subject areas, including core and complementary programs. In addition to making linkages across the curriculum, making connections between what students have already learned in other settings (e.g., home, community and workplace) can also be achieved through this strand.

### LINKAGES

#### With Basic Competencies

The Construction Technologies strand supports the development and integration of the basic competencies related to personal and resource management, problem solving, safe work practices and social interactions throughout the introductory, intermediate and advanced modules. It is important that students develop these competencies because success in the workplace often depends more on these skills than on many of the technical or academic skills they possess.

#### With Other CTS Strands

Construction Technologies complements modules from a number of other strands, e.g., Agriculture, Communication Technology, Design Studies, Enterprise and Innovation, Fabrication Studies, Forestry and Logistics.

Specific linkages that may be of interest to students in Construction Technologies include:

Strand	Module	Linkage
Agriculture	AGR2050 Agrifoods 1	Construction of structures used in processing and storage of agriculture products, livestock and equipment.

Strand	Module	Linkage
Career Transitions	Project Modules	Provide opportunity and direction for students involved in projects beyond the expectations of a given Construction Technologies module.
	Practicum Modules	Provide opportunity for students to work towards an externally developed and recognized credential related to the strand.
Design Studies	DES1010 Sketch, Draw & Model	Can be offered in conjunction with a student project and design module.
	DES2050 Technical Drawing Applications	Used in the context of house design and residential systems.
Enterprise and Innovation	ENT1020 Planning a Venture	Used in conjunction with manufacturing and production modules.
Fabrication Studies	FAB2010 Structural Engineering	Studied in the context of concrete work and framing techniques.
Forestry	FOR2070 Harvest Practices	Forest products used in construction.
Logistics	LOG1040 Purchasing 1	Used in conjunction with purchasing materials for project work.



It is important to note that project, practicum and safety modules from the Career Transitions strand may be combined with modules from the Construction Technologies strand to provide increased opportunity for students to develop expertise and refine their competencies in a particular area of study, such as:

- acquiring safety skills and credentials
- completing a larger more complex project
- enhancing specific carpenter, cabinetmaking or other trade skills
- expanding a module topic or theme.

Examples of CTR project modules that have been developed as extension to existing modules are shown in this section.

Linkages between Construction Technologies modules and other strands and across the curriculum have also been identified. Refer to “Construction Technologies: Connections With Other CTS Strands” and “Construction Technologies Connections Across the Curriculum.”

In addition, modules may be aligned according to the course emphasis and themes that run between modules and strands as outlined in “Construction Technologies: Junior High School Module Clusters” and “Construction Technologies: Senior High School Module Clusters.”

For a summary of modules that can be combined with Construction Technologies from other strands, refer to “Construction Technologies: Extended Scope and Sequence.”

### With Elementary Programs

The development of concepts related to Construction Technologies can begin as early as ECS using hand tool activities and teaching strategies similar to those outlined in the “Integrated Practical Activities for Elementary Grades,” Alberta Education, 1980.

### With Other Secondary Programs

To help make learning more authentic and significant, it is important to integrate the core and complementary areas with Construction Technologies whenever possible. By being aware of and supporting the content of other curricula promotes relevance and reinforces core and complementary courses outlined in the following chart.

Subject	Linkage
Language Arts	Technical report writing, task analysis, event scheduling and oral and multimedia presentations.
Mathematics	Measurement, calculation of area and volume, use of fractions, ratios, geometry and trigonometry.
Science	Material properties, structures, chemical safety, use of simple machines and electricity as well as related environmental concerns.
Social Studies	Economics, impact of technology on society, resource development and industrial relationships.
CALM	Career assessment and preparation.
Art	Wood carving, picture framing, inlaying and marquetry.
Drama	Stage prop construction and set design.



## With Practical Arts Courses

As of September 1997, modules in the Construction Technologies strand replaced many of the existing practical arts junior and senior high programs. A detailed correlation of the Construction Technologies strand modules to the related practical arts courses can be found in this section (see "Construction Technologies: Correlations to Junior/Senior High School Practical Arts Courses").

## TRANSITIONS

### To the Community/Workplace

Competencies developed in Construction Technologies provide students with many of the entry level skills required in the workplace (see "Construction Technologies: Module Relationships to Specific Trades and Occupations."

The National Occupational Classification (NOC) shown in chart form in this section indicates occupations for which Construction Technologies provides a foundation (see "Construction Technologies: Related Occupations"). According to this chart, high school students could potentially move into nine occupations requiring high school education and 21 trades related to Construction Technologies.

### To Related Post-secondary Programs

The themes and modules offered in Construction Technologies are consistent with many of the pre-employment and apprenticeship courses now being offered by post-secondary institutions.

A number of articulation agreements have been established with post-secondary institutions in Alberta. These agreements provide preferred entrance and/or advanced standing/credit for CTS students who have successfully completed designated modules. A current summary of articulation agreements in place that involve CTS modules is available through Alberta Education's web site at <<http://ednet.edc.gov.ab.ca>>. For further information regarding particular articulation agreements, contact the post-secondary institution and/or review its calendar.

CTS courses in Construction Technologies may also link with one or more of Alberta's Apprenticeship Training Programs; e.g., Carpenter, Cabinetmaker. Students who are employed as an apprentice in one of these trade areas and have successfully completed designated CTS modules may also qualify, upon the recommendation of their employer, for a portion of the in-school training component. A summary of articulation agreements established for specific apprenticeship trades (including a correlation to CTS modules) is available through Alberta Education's web site. Further information regarding apprenticeship linkages can be obtained by contacting Alberta Advanced Education and Career Development, Apprenticeship and Industry Training Division.

An outline of post-secondary institutions in Alberta currently offering programs related to Construction Technologies is in "Construction Technologies: Summary of Related Post-secondary Programs."

## CREDENTIALLING

Students may earn partial or complete credentials recognized in the workplace and/or post-secondary institutions by demonstrating specified competencies within the CTS curriculum. The Construction Technologies strand, in conjunction with modules from the Career Transitions strand, provides opportunities for students to develop competencies related to:

- Explosive Actuated Tools
- Construction Safety Training
- Emergency First Aid
- Workplace Hazardous Materials Information System
- Transportation of Dangerous Goods.

Further information regarding credentialling in Construction Technologies is provided in "Credentialling Opportunities in Construction Technologies" and the *Career & Technology Studies Manual for Administrators, Counsellors and Teachers*, Appendix 14.



## LINKAGES – Construction Technologies: Sample CTR Project Modules

### MODULE CTR2110: PROJECT 2A – CONCRETE FORMING

**Level:** Intermediate

**Theme:** Career Extensions

**Prerequisite:** CON2020 Concrete Forming

**Module Parameters:** Access to a building site and instruction from an individual with specialized training in concrete forming and placing

Students extend and enhance competencies related to form construction and concrete placement.

#### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"><li>propose, manage and assess a project</li><li>meet goals as defined within the project plan</li></ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"><li>successful completion of project, including project:<ul style="list-style-type: none"><li>proposal</li><li>management</li><li>completion</li><li>assessment</li><li>presentation.</li></ul></li></ul> <i>Assessment Tool</i> <i>CTR Project: Career Extensions Modules</i>	20 20 20 20 20
<ul style="list-style-type: none"><li>demonstrate basic competencies.</li></ul>	<ul style="list-style-type: none"><li>observations of individual effort and interpersonal interaction during the learning process.</li></ul> <i>Assessment Tool</i> <i>Basic Competencies Reference Guide and any assessment tools noted above</i>	Integrated throughout



## LINKAGES – *Construction Technologies: Sample CTR Project Modules*

### MODULE CTR2110: PROJECT 2A: CONCRETE FORMING (continued)

Concept	Specific Learner Expectations	Notes ★
Project Definition	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• identify a project</li> <li>• outline related issues and implications</li> <li>• prepare a project plan: <ul style="list-style-type: none"> <li>– clarify the purposes of the project</li> <li>– define project deliverables</li> <li>– specify project timelines; e.g., key decision points, consultation points</li> <li>– define resource needs; e.g., materials, costs, support network</li> </ul> </li> <li>• identify and comply with all related health and safety standards</li> <li>• define assessment standards (indicators for success)</li> <li>• present project proposal and obtain necessary approvals.</li> </ul>	<p>Have student identify the type and amount of form work to be completed.</p> <p>Discuss the need for an event sequence and cost estimate for the form work and concrete placement being undertaken.</p> <p>Standards should be consistent with those held by the trades.</p>
Project Management	<ul style="list-style-type: none"> <li>• proceed with the project as outlined by the project plan</li> <li>• monitor project and make necessary adjustments to project plan.</li> </ul>	<p>Project monitoring should include regular progress checks and consultation with teacher and others.</p>
Project Presentation and Assessment	<ul style="list-style-type: none"> <li>• present the project: <ul style="list-style-type: none"> <li>– outcomes attained</li> <li>– relationship to goals set originally</li> </ul> </li> <li>• assess the project: <ul style="list-style-type: none"> <li>– processes and strategies used</li> <li>– recommendations for how the project could have been improved.</li> </ul> </li> </ul>	<p>Project presentation could be in print, a display of the project or a description of the processes undertaken.</p> <p>Student assessment could be print, verbal and/or audio-visual.</p>

★ Refer to the *Guide to Standards and Implementation* for a particular strand for suggestions about how project modules could be used to complement and enhance the learning.



## LINKAGES – Construction Technologies: Sample CTR Project Modules

### MODULE CTR2120: PROJECT 2B – EXTERIOR WALL AND EAVE FINISHING

**Level:** Intermediate

**Theme:** Career Extensions

**Prerequisite:** CON2060 Exterior Finishing

**Module Parameters:** Access to a building site and instruction from an individual with specialized training in exterior finishing.

Students extend and enhance competencies related to the installation of finishing materials on exterior walls and roof projections.

#### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"><li>propose, manage and assess a project</li><li>meet goals as defined within the project plan</li></ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"><li>successful completion of the project including project:<ul style="list-style-type: none"><li>proposal</li><li>management</li><li>completion</li><li>assessment</li><li>presentation.</li></ul></li></ul> <i>Assessment Tool</i> <i>Career Extension (Project)</i> <i>Modular Assessment Tool (CTR Project)</i>	20 20 20 20 20
<ul style="list-style-type: none"><li>demonstrate effort to develop basic competencies.</li></ul>	<ul style="list-style-type: none"><li>observations of individual effort and interpersonal interaction during the learning process.</li></ul> <i>Assessment Tool</i> <i>Basic Competencies Reference Guide and any assessment tools noted above</i>	Integrated throughout



## LINKAGES – Construction Technologies: Sample CTR Project Modules

### MODULE CTR2120: PROJECT 2B: EXTERIOR WALL AND EAVE FINISHING (continued)

Concept	Specific Learner Expectations	Notes ★
Project Definition	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• identify a project</li> <li>• outline related issues and implications</li> <li>• prepare a project plan: <ul style="list-style-type: none"> <li>– clarify the purposes of the project</li> <li>– define project deliverables</li> <li>– specify project timelines; e.g., key decision points, consultation points</li> <li>– define resource needs; e.g., materials, costs, support network</li> </ul> </li> <li>• identify and comply with all related health and safety standards</li> <li>• define assessment standards (indicators for success)</li> <li>• present project proposal and obtain necessary approvals.</li> </ul>	<p>Have student identify the type and amount of finishing materials to be used.</p> <p>Discuss the need for an event sequence and cost estimate to apply a new or replace an old finish.</p> <p>Standards should be consistent with those held by the trades.</p>
Project Management	<ul style="list-style-type: none"> <li>• proceed with the project as outlined by the project plan</li> <li>• monitor project and make necessary adjustments to project plan.</li> </ul>	<p>Project monitoring should include regular progress checks and consultation with teacher and others.</p>
Project Presentation and Assessment	<ul style="list-style-type: none"> <li>• present the project: <ul style="list-style-type: none"> <li>– outcomes attained</li> <li>– relationship to goals set originally</li> </ul> </li> <li>• assess the project: <ul style="list-style-type: none"> <li>– processes and strategies used</li> <li>– recommendations for how the project could have been improved.</li> </ul> </li> </ul>	<p>Project presentation could be in print, a display of the project or a description of the processes undertaken.</p> <p>Student assessment could be print, verbal and/or audio-visual.</p>

★ Refer to the *Guide to Standards and Implementation* for a particular strand for suggestions about how project modules could be used to complement and enhance the learning.



## LINKAGES – Construction Technologies: Connections With Other CTS Strands

Construction Technologies Modules	Other CTS Strands																						
	Agriculture	Career Transitions	Communication Technology	Community Health	Cosmetology Studies	Design Studies	Electro-Technologies	Energy and Mines	Enterprise and Innovation	Fabrication Studies	Fashion Studies	Financial Management	Foods	Forestry	Information Processing	Legal Studies	Logistics	Management and Marketing	Mechanics	Tourism Studies	Wildlife		
<b>Theme: Building Systems (Processes and Applications)</b>																							
CON1010: Basic Tools & Materials																							
CON1070: Building Construction																							
CON2010: Site Preparation																							
CON2020: Concrete Forming																							
CON2030: Alternate Foundations																							
CON2040: Framing Systems 1 (Floor & Wall)																							
CON2050: Roof Structures 1 (Framing and Finishing)																							
CON2060: Exterior Finishing (Door, Window & Siding)																							
CON2070: Electrical Systems																							
CON2080: Plumbing Systems																							
CON2090: Climate Control Systems																							
CON2100: Agri-structures																							
CON3010: Concrete Work (Structures & Finishes)																							
CON3020: Masonry Work (Structures & Finishes)																							
CON3030: Wall & Ceiling Finishing																							
CON3040: Stair Construction																							
CON3050: Roof Structures 2 (Framing & Covering)																							
CON3060: Doors & Trim																							
CON3070: Floorcovering																							
CON3080: Energy-efficient Housing																							
CON3090: Renovations/Restorations																							
CON3100: Commercial Structures																							
CON3110: Site Management																							
<b>Theme: Manufacturing Systems (Processes and Applications)</b>																							
CON1120: Project Management																							
CON1130: Solid Stock Construction																							
CON1140: Turning Operations																							
CON1160: Manufactured Materials																							
CON1180: Mold Making & Casting																							
CON2120: Multiple Materials																							
CON2130: Furniture Making 1 (Box Construction)																							
CON2140: Furniture Making 2 (Frame & Panel)																							
CON2150: Finishing & Refinishing																							
CON2160: Cabinetmaking 1 (Web & Face Frame)																							
CON2170: Cabinetmaking 2 (Door & Drawer)																							
CON2180: Wood Forming																							
CON2190: Manufacturing Systems																							
CON2200: Product Development																							
CON3120: Tool Maintenance																							
CON3130: Furniture Making 3 (Leg & Rail)																							
CON3140: Furniture Making 4 (Surface Enhancement)																							
CON3150: Furniture Repair																							
CON3160: Cabinetmaking 3 (Cabinets/Countertops)																							
CON3170: Cabinetmaking 4 (Layout & Installation)																							
CON3190: Production Planning																							
CON3200: Production Management																							
CON3210: Framing Systems 2 (Floor, Wall & Ceiling)																							

Provides many direct links with competencies in this strand. Students will reinforce, extend and apply a substantial number of knowledge and/or skill components in practical situations.



Provides some links with competencies developed in this strand, usually through the application of related technologies and/or processes.





# LINKAGES – Construction Technologies: Connections Across the Curriculum

Construction Technologies Modules	Across the Curriculum															
	Junior High								Senior High							
	Language Arts	Social Studies	Mathematics	Science	Health & PLS	Physical Education	Fine Arts	English	Social Studies	Mathematics	Science (General)	Biology	Chemistry	Physics	CALM	Physical Education
<b>Theme: Building Systems (Processes and Applications)</b>																
CON1010: Basic Tools & Materials																
CON1070: Building Construction																
CON2010: Site Preparation																
CON2020: Concrete Forming																
CON2030: Alternate Foundations																
CON2040: Framing Systems 1 (Floor & Wall)																
CON2050: Roof Structures 1 (Framing & Finishing)																
CON2060: Exterior Finishing (Door, Window & Siding)																
CON2070: Electrical Systems																
CON2080: Plumbing Systems																
CON2090: Climate Control Systems																
CON2100: Agri-structures																
CON3010: Concrete Work (Structures & Finishes)																
CON3020: Masonry Work (Structures & Finishes)																
CON3030: Wall & Ceiling Finishing																
CON3040: Stair Construction																
CON3050: Roof Structures 2 (Framing & Covering)																
CON3060: Doors & Trim																
CON3070: Floorcovering																
CON3080: Energy-efficient Housing																
CON3090: Renovations/Restorations																
CON3100: Commercial Structures																
CON3110: Site Management																
<b>Theme: Manufacturing Systems (Processes and Applications)</b>																
CON1120: Project Management																
CON1130: Solid Stock Construction																
CON1140: Turning Operations																
CON1160: Manufactured Materials																
CON1180: Mold Making & Casting																
CON2120: Multiple Materials																
CON2130: Furniture Making 1 (Box Construction)																
CON2140: Furniture Making 2 (Frame & Panel)																
CON2150: Finishing & Refinishing																
CON2160: Cabinetmaking 1 (Web & Face Frame)																
CON2170: Cabinetmaking 2 (Door & Drawer)																
CON2180: Wood Forming																
CON2190: Manufacturing Systems																
CON2200: Product Development																
CON3120: Tool Maintenance																
CON3130: Furniture Making 3 (Leg & Rail)																
CON3140: Furniture Making 4 (Surface Enhancement)																
CON3150: Furniture Repair																
CON3160: Cabinetmaking 3 (Cabinets/Countertops)																
CON3170: Cabinetmaking 4 (Layout & Installation)																
CON3190: Production Planning																
CON3200: Production Management																
CON3210: Framing Systems 2 (Floor, Wall & Ceiling)																

Provides many direct links with course content. Students will reinforce, extend and apply a substantial number of knowledge and/or skill components in practical contexts.

Provides some links with course content, usually through the application of related technologies and/or processes.



## LINKAGES – Construction Technologies: Connections With Other CTS Strands

### LINKAGES - Construction Technologies: Junior High School Module Clusters

Course Emphasis	Construction Technologies Modules	Design Studies Modules	Fabrication Studies Modules	Forestry Modules
Production (3 modules)	Basic Tools & Materials (CON1010)		Production Systems (FAB1160)	
	Building Construction (CON1070)			
Planning and Management (4 modules)	Project Management (CON1120)	Sketch, Draw & Model (DES1010)	Basic Tools & Materials (CON1010)	
	Solid Stock Construction (CON1130)			
Carpentry (6 modules)	Building Construction (CON1070)	Sketch, Draw & Model (DES1010)	Basic Tools & Materials (CON1010)	
	Solid Stock Construction (CON1130)			
	Manufactured Materials (CON1160)			
Cabinetry (6 modules)	Project Management (CON1120)	Sketch, Draw & Model (DES1010)	Basic Tools & Materials (CON1010)	Harvest Practices (Fibre Harvesting and Processing) (FOR2070)
	Solid Stock Construction (CON1130)			
	Turning Operations (CON1140)			



## LINKAGES - Construction Technologies: Senior High School Module Clusters

### Introductory Focus

#### Themes

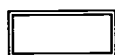
Exploration	Basic Tools & Materials (CON1010)	Building Construction (CON1070)	Production Systems (FAB1160)
Planning and Management	Sketch, Draw & Model (DES1010)	Project Management (CON1120)	Solid Stock Construction (CON1130)
Material Processing	Mold Making & Casting (CON1180)	Manufactured Materials (CON1160)	Fundamentals of Recycling (ENM1090)
Design	The Design Process (DES1020)	Turning Operations (CON1140)	Multiple Materials (CON2120)

### Intermediate Focus

Tool Processes	Manufactured Materials (CON1160)	Furniture Making 1 (CON2130)	Furniture Making 2 (CON2140)
	Cabinetmaking 1 (CON2160)	Cabinetmaking 2 (CON2170)	
Print Reading and Layout	2-D Design Applications (DES2010)	Print Reading (FAB2020)	Site Preparation (CON2010)
Structural Design	Structural Engineering (FAB2010)	Framing Systems 1 (CON2040)	Roof Structures 1 (CON2050)

### Advanced Focus

Material Processes	Concrete Work (CON3010)	Masonry Work (CON3020)	Wall & Ceiling Finishing (CON3030)
Interior Finishing	Stair Construction (CON3040)	Doors & Trim (CON3060)	Floor Covering (CON3070)
Energy Efficiency	Energy Designs/Systems 1 (ENM2090)	Energy Efficient Housing (CON3080)	Renovations/Restorations (CON3090)
Commercial Construction	Building Construction (CON1070)	Commercial Structures (CON3100)	Site Management (CON3110)
Design	Draft/Design Applications (DES2040)	Furniture Making 3 (CON3130)	Renovations/Restorations (CON3090)
Production	Manufacturing Systems (CON2190)	Production Planning (CON3190)	Production Management (CON3200)



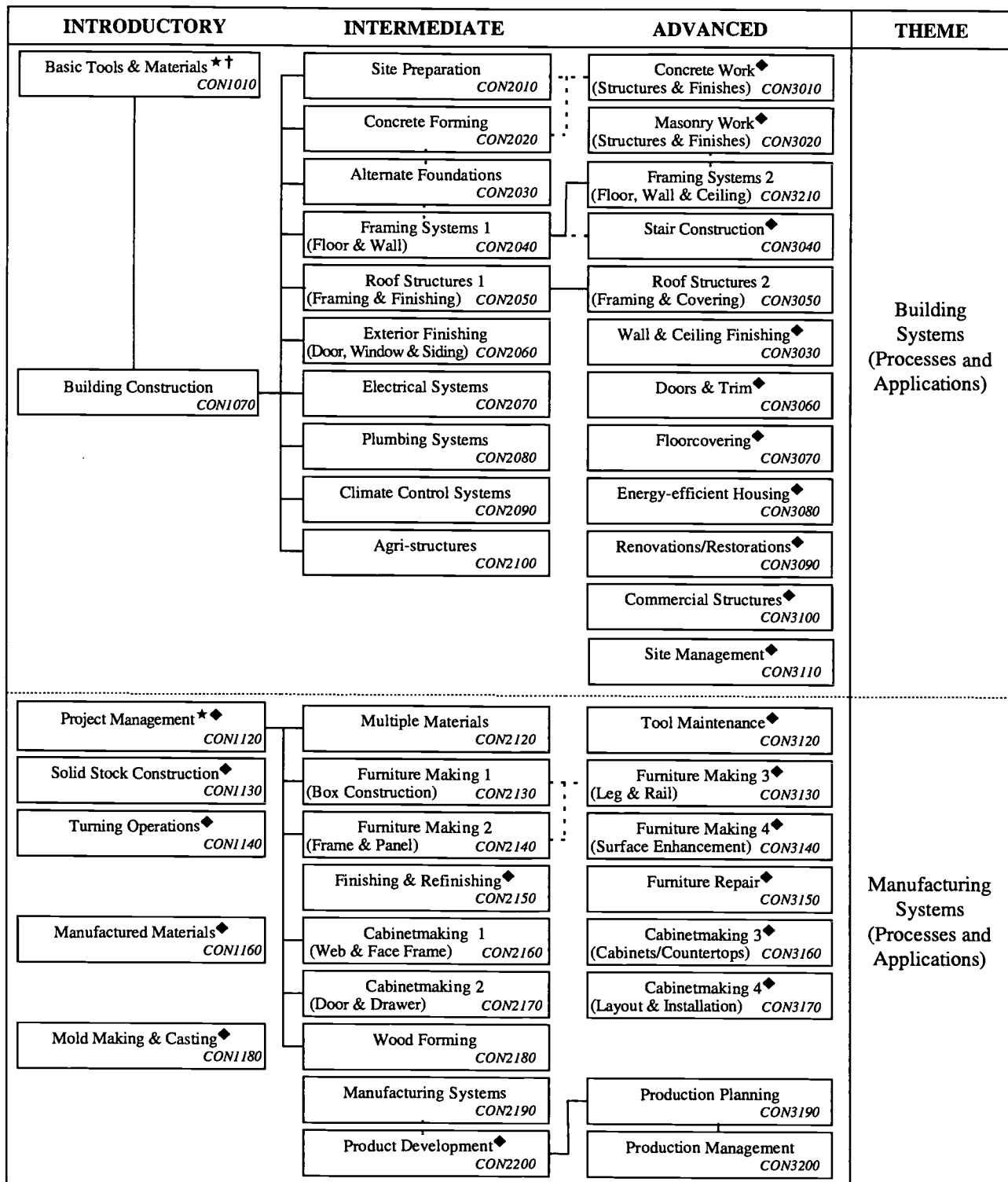
Indicates Linking Module.

**BEST COPY AVAILABLE**



# LINKAGES – Construction Technologies: Connections With Other CTS Strands

## Construction Technologies: Scope and Sequence



—— Prerequisite

.... Recommended sequence

★ Module provides a strong foundation for further learning in this strand.

† Module is also offered in Fabrication Studies.

♦ Refer to specific modules for additional prerequisites.

H.14/ Construction Technologies, CTS  
(1997)



## LINKAGES – Construction Technologies: Extended Scope and Sequence

THEME	INTRODUCTORY	INTERMEDIATE	ADVANCED
Building Systems (Processes and Applications)		Project 2A <i>CTR2110</i>	
		Harvest Practices <i>FOR2070</i>	Practicum A <i>CTR3040</i>
		Structural Engineering <i>FAB2010</i>	
	Sketch, Draw & Model <i>DES1010</i>	Technical Drawing Applications <i>DES2050</i>	Living Environment Studio 2 <i>DES3080</i>
		Project 2B <i>CTR2120</i>	
		Print Reading <i>FAB2020</i>	Info Management Tools <i>INF3080</i>
	CAD Fundamentals <i>DES1050</i>		
Manufacturing Systems (Processes and Applications)		CAD Applications <i>DES2030</i>	
	Fundamentals of Recycling <i>ENM1090</i>		
	Production Systems <i>FAB1160</i>		3-D Design Studio 3 <i>DES3060</i>
	Planning a Venture <i>ENT1020</i>	Implementing the Venture <i>ENT2040</i>	Managing the Venture <i>ENT3010</i>



## H.16/ Construction Technologies, CTS

Linkages/Transitions  
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**LINKAGES - Construction Technologies:**  
**Module Relationships to Specific Trades and Occupations**

Introductory, Intermediate and Advanced Modules	Bricklayer	Cabinetmaker	Carpenter	Cement Finisher	Construction Estimator	Electrician	Floor Covering Installer	Lather - Interior	Painter & Decorator	Plasterer	Plumber	Recreation Veh. Maintenance	Residential Bldg. Renovator	Roofer	Saw Filer	Tile Setter	Wood Product Assembler	Woodworking Mach. Operator
Basic Tools & Materials		X	X														X	X
Building Construction			X		X								X					
Project Management	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	
Solid Stock Construction		X	X										X					
Turning Operations		X	X										X					X
Manufactured Materials		X	X														X	X
Mold Making & Casting		X	X	X														
Site Preparation	X		X								X							
Concrete Forming	X		X		X													
Alternate Foundations			X		X													
Framing Systems 1			X		X		X					X						
Roof Structures 1			X									X		X				
Exterior Finishing			X															
Electrical Systems						X						X						
Plumbing Systems											X	X						
Climate Control Systems						X					X	X						
Agri-structures	X		X	X	X	X					X			X				
Multiple Materials		X										X	X					X
Furniture Making 1 and 2		X																X
Finishing & Refinishing		X	X										X				X	
Cabinetmaking 1 and 2		X															X	X
Wood Forming		X	X															
Manufacturing Systems																	X	
Product Development																	X	X
Concrete Work				X														
Masonry Work	X			X														
Framing Systems 2			X		X								X					
Wall & Ceiling Finishing			X						X									
Stair Construction			X															
Roof Structures 2			X											X				
Doors & Trim		X	X														X	
Floorcovering			X				X											
Energy-efficient Housing			X															
Renovations/Restorations	X	X	X	X	X	X	X	X	X	X	X		X	X		X		
Commercial Structures	X	X	X	X	X	X	X	X	X	X	X			X	X	X		
Site Management	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X		
Tool Maintenance		X	X			X									X		X	X
Furniture Making 3 and 4		X															X	X
Furniture Repair		X															X	X
Cabinetmaking 3 and 4		X	X	X									X		X			
Production Planning																	X	X
Production Management																	X	X



## TRANSITIONS – *Construction Technologies: Related Occupations*

Information for this chart was obtained from the National Occupational Classification (NOC) descriptions.

### Educational Requirements:

D: High School Education  
C: Apprenticeship

B: College or Vocational Education  
A: University

Occupation Profile	NOC#	D	C	B	A
Bricklayer	7281		✓		
Cabinetmaker	7272		✓		
Carpenters	7271		✓		
Cement Finisher	7282		✓		
Concrete, Clay and Stone Forming Operators	9419	✓			
Construction Estimator	2234	✓		✓	
Construction Inspector	2264	✓		✓	
Construction Manager	0711	✓		✓	✓
Construction Trade Helpers and Labourers	7611	✓			
Contractors and Supervisors, Carpentry Trades	7215		✓		
Contractors and Supervisors, Heavy Construction Equipment Crews	7217		✓		
Contractors and Supervisors, Other Construction Trades, Installers, Repairers and Services	7219		✓		
Contractors and Supervisors, Pipefitting Trades	7213		✓		
Crane and Hoisting Equipment Operators	7371		✓		
Elevator Constructor	7318		✓		
Floorcovering Installer	7295		✓		
Gasfitter	7253		✓		
Glazier/Glassworker	7292		✓		
Heavy Equipment Operator	7421	✓			
Insulator	7293				
Lather/Interior Systems Mechanics	7284		✓		
Machinist/Machining Tool Operators	9511		✓		
Nondestructive Testers and Inspectors	2261			✓	
Other Trades and Related Occupations	7383	✓		✓	
Other Wood Products Assemblers and Inspectors	9493	✓			
Painters and Decorators	7294		✓		
Plasterers, Drywall Installers and Finishers and Lathers	7284		✓		
Plating, Metal Spraying and Related Operators	9497	✓			
Plumber	7251		✓		
Residential Home Builders and Renovators	0712				
Roofer	7291		✓		
Steamfitters, Pipefitters and Sprinkler System Installers	7252		✓		
Tilesetter	7283		✓		
Woodworking Machine Operator	9224		✓		



# TRANSITIONS - Construction Technologies: Summary of Related Post-secondary Programs

	PUBLIC COLLEGES										APPRENTICESHIP TRADE					PRIVATE COLLEGES					TECH. INST.		Banff	UNIVERSITIES			VOCATIONAL COLLEGES																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
	Alberta College of Art & Design	Fairview College	Grande Prairie Regional College	Grant MacEwan Community College	Keyano College	Lakeland College	Lethbridge Community College	Medicine Hat College	Mount Royal College	Olds College	Red Deer College																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														

CODES: B Bachelor's Degree D Diploma (2 years) w weeks  
M Master's Degree V Varies m months  
Ph.D. Doctoral Degree 1t One-year transfer y years  
C Certificate (1 year or less) 2t Two-year transfer

\*Information adapted from "It's About Time: To Start Thinking About Your Future," Advanced Education and Career Development, 1995.



## **CREDENTIALLING – *Construction Technologies: Credentialling Opportunities*★ (March 1997)**

The following credentialling opportunities link with modules in the Construction Technologies and other strands.

<b>Certificate</b>	<b>Agency</b>	<b>Modules</b>	<b>Instructor Qualifications</b>	<b>Comments</b>
Explosive Actuated Tools	Technical Institute or College (post-secondary)	Concrete Work (CON3010)	EAT certificate	Required by OH&S for all operators to be certified.  Formal credentialling to be arranged through local college or technical institute.
Construction Safety Training System	Alberta Construction Safety Association	Site Management (CON3110)	Alberta Construction Safety Association Trainer	Can be offered through a CD-ROM interactive video computer system.
Emergency First Aid	St. John Ambulance Canadian Red Cross	Personal Safety (Management) (CTR1210)	Certified First Aid/CPR Instructor	Three-year nationally recognized certificate.
Workplace Hazardous Materials Information Systems (WHMIS)	Occupational Health and Safety	Personal Safety (Management) (CTR1210)	WHMIS Instructor	Addresses skills required to work safely with hazardous materials.
Transportation of Dangerous Goods (TDG)	Transportation and Utilities	Workplace Safety (Practices) (CTR2210)	TDG Instructor	Addresses skills required by individuals involved with the transportation and handling of dangerous goods.

★ Further information regarding these and other credentialling opportunities available to CTS students is available through Alberta Education's web site at <<http://ednet.edc.gov.ab.ca>>.



# CONSTRUCTION TECHNOLOGIES

## SECTION I: LEARNING RESOURCE GUIDE

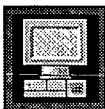
This section of the GSI has been designed to provide a list of resources that support student learning.

Three types of resources are identified:

- **Authorized:** Resources authorized by Alberta Education for CTS curriculum; these resources are categorized as basic, support, or teaching
- **Other:** Titles provided as a service to assist local jurisdictions to identify resources that contain potentially useful ideas for teachers. Alberta Education has done a preliminary review of these resources, but further review will be necessary prior to use in school jurisdictions
- **Additional:** A list of local, provincial and national sources of information available to teachers, including the community, government, industry, and professional agencies and organizations.

The information contained in this Guide, although as complete and accurate as possible as of June 1997, is time-sensitive.

For the most up-to-date information on learning resources and newer editions/versions, consult the LRDC *Buyers Guide* and/or the agencies listed in the Distributor Directory at the end of this section.



**CTS is on the Internet.**

Internet Address:

<http://ednet.edc.gov.ab.ca>



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# INTRODUCTION

## CTS AND THE RESOURCE-BASED CLASSROOM

Career and Technology Studies (CTS) encourages teachers to establish a resource-based classroom, where a variety of appropriate, up-to-date print and nonprint resources are available. Learning resources identified for CTS strands include print, software, video and CD-ROM formats. Also of significance and identified as appropriate throughout each strand are sources of information available through the Internet.

The resource-based classroom approach accommodates a variety of instructional strategies and teaching styles, and supports individual or small group planning. It provides students with opportunities to interact with a wide range of information sources in a variety of learning situations. Students in CTS are encouraged to take an active role in managing their own learning. Ready access to a strong resource base enables students to learn to screen and use information appropriately, to solve problems, to meet specific classroom and learning needs, and to develop competency in reading, writing, speaking, listening and viewing.

## PURPOSE AND ORGANIZATION OF THIS DOCUMENT

The purpose of this document is to help teachers identify a variety of resources to meet their needs and those of the students taking the new CTS curriculum. It is hoped that this practical guide to resources will help teachers develop a useful, accessible resource centre that will encourage students to become independent, creative thinkers.

This document is organized as follows:

- Authorized Resources:
  - basic learning resources
  - support learning resources
  - teaching resources
- Other Resources
- Additional Sources
- Distributor Directory.

Some resources in the guide have been authorized for use in some or all of the CTS strands, e.g., the Career and Technology Studies video series produced by ACCESS: The Education Station. Further information is provided in relevant sections of this resource guide.

Each resource in the guide provides bibliographic information, an annotation where appropriate, and a module correlation to the CTS modules. The distributor code for each entry will facilitate ordering resources. It is recommended that teachers preview all resources before purchasing, or purchase one copy for their reference and additional copies as required.

Distributor Code	Resources		Levels/Mod. No.			1 = Introductory 2 = Intermediate 3 = Advanced  Indicates module number
			1	2	3	
ACC	Title	Author	1010	2010	3010	
	Bibliographic Information					
	Annotation					

Distributor Code - see Distributor Directory



## HOW TO ORDER

Most authorized resources are available from the Learning Resources Distributing Centre (LRDC) at:

12360 – 142 Street  
Edmonton, AB T5L 4X9  
Telephone: 403-427-5775 (outside of Edmonton dial 310-0000 to be connected toll free)  
Fax: 403-422-9750  
Internet: <http://ednet.edc.gov.ab.ca/lrdc>

Please check LRDC for availability of videos.

## RESOURCE POLICY

Alberta Education withdraws learning and teaching resources from the provincial list of approved materials for a variety of reasons; e.g., the resource is out of print; a new edition has been published; the program has been revised. Under section 44 (2) of the *School Act*, school boards may approve materials for their schools, including resources that are withdrawn from the provincial list. **Many school boards have delegated this power to approve resources to school staff or other board employees under section 45 (1) of the *School Act*.**

For further information on resource policy and definitions, refer to the *Student Learning Resources Policy* and *Teaching Resources Policy* or contact:

Learning Resources Unit, Curriculum Standards Branch  
Alberta Education  
5<sup>th</sup> Floor, Devonian Building, East Tower  
11160 Jasper Avenue  
Edmonton, AB T5K 0L2  
Telephone: 403-422-4872 (outside of Edmonton dial 310-0000 to be connected toll free)  
Fax: 403-422-0576  
Internet: <http://ednet.edc.gov.ab.ca>

**Note:** Owing to the frequent revisions of computer software and their specificity to particular computer systems, newer versions may not be included in this guide. However, schools may contact the LRDC directly at 403-427-5775 for assistance in purchasing computer software.

**Trademark Notices:** Microsoft, Access, Excel, FoxPro, Mail, MS-DOS, Office, PowerPoint, Project, Publisher, Visual Basic, Visual C++, Windows, Windows NT, Word, and Works are either registered trademarks or trademarks of Microsoft Corporation. Apple, Mac, Macintosh, and Power Macintosh are either registered trademarks or trademarks of Apple Computer, Inc. Other brand and product names are registered trademarks or trademarks of their respective holders.



## AUTHORIZED RESOURCES

### BASIC LEARNING RESOURCES

The following basic learning resources have been authorized by Alberta Education for use in the Construction Technologies curriculum. These resources address the majority of the learner expectations in one or more modules and/or levels. A curriculum correlation appears in the right-hand column.

Distributor Code	Resources	Levels/Module No.		
		1	2	3
LRDC	<p><i>Carpentry and Building Construction.</i> (5<sup>th</sup> edition.) J. Feirer et al. Glencoe/McGraw-Hill, 1997.</p> <p>A comprehensive building construction resource for the advanced level student. Newly revised with up-to-date information on engineered work products, energy efficiency, remodelling and renovating. Includes cross-curricular activities to build skills in language arts, math, science and social studies. An instructor's resource guide provides lesson plans, career profiles, masters and transparencies. A student workbook is also available.</p>	1070	2010 to 2090	3010 to 3070 3090 3110 3120 3160 3170 3210
LRDC	<p><i>Cabinetmaking and Millwork.</i> John L. Feirer. Mission Hills, CA: Glencoe Publishing Company, 1988.</p> <p>Provides step-by-step instruction on how to build furniture, cabinets, built-ins and interior wall finishing as well as wood finishing techniques. Also includes a section on tool maintenance and industrial production.</p>	1120 1130 1140 1160	2130 to 2180	3120 to 3190
LRDC	<p><i>Design and Technology.</i> Colin Caborn, Ian Mould and John Cave. Scarborough, ON: Nelson Canada, 1989.</p> <p>Adopts an integrated approach that links design with technology. Content includes information and activities related to materials, tools, structures, mechanism and micro electronics.</p>	1010 1070 1120 1130 1160 1180	2120 to 2170 2200	
LRDC	<p><i>Exploring Woodworking: Fundamentals of Technology.</i> Fred W. Zimmerman and Larry J. McWard. South Holland, IL: Goodheart-Willcox Co. Inc., 1993.</p> <p>Deals with the fundamentals of working safely with hand and power tools. Emphasizes the important role that wood and wood by-products play in our everyday lives. Project ideas are included. Student workbook contains questions on each chapter. Uses Imperial measurement only. Instructor's guide and answer key are available.</p>	1010 1120 1130 1140	2140 to 2180 2200	3130 3140 3150
LRDC	<p><i>Living With Technology.</i> (2<sup>nd</sup> edition.) Michael Hacker and Robert Barden. Albany, NY: Delmar Publishers Inc., 1993.</p> <p>Uses a "cluster" framework to analyze the major areas of technology—manufacturing, construction, communications, energy, power and transportation. The teacher's resource guide includes lesson plans, teaching strategies, quizzes and instructional aides for each chapter. Uses Imperial measurements only.</p>	1010 1070 1120 1130 1140 1160 1180	2010 2020 2040 2050 2070 2080 2190 2200	3010 3090 3100 3190 3200



# Basic Learning Resources (continued)

Distributor Code	Resources	Levels/Module No.		
		1	2	3
LRDC	<p><i>Modern Carpentry: Building Construction Details in Easy-to-Understand Form.</i> Willis H. Wagner and H. Smith. Goodheart-Willcox Co., Inc., Irwin Publishing, 1996.</p> <p>Provides current information about equipment methods and materials employed in light and residential construction. Other topics include post and beam construction, fireplaces, prefabricated structures and solar heating. The text contains 1600 photos and drawings with a colour section dedicated to wood samples and their various colour samples and their various colour and grain characteristics. Instructor's manual includes lesson plans, teaching strategies, and answers to student workbook. Teacher's resource binder and transparencies are useful tools for teaching carpentry accompanied with the textbook. The resource binder facilitates the development of a carpentry curriculum by offering suggestions on course content and providing course material for the novice as well as the experienced instructor. Uses Imperial measurement only.</p>	1070	2010 to 2060	3010 to 3080 3100 3160 3170
LRDC	<p><i>Modern Woodworking.</i> W. Wagner and C. Kicklighter. Goodheart-Willcox Co., Inc., Irwin Publishing, 1996.</p> <p>This set of resources is intended for a wide audience ranging from high school student to apprentice cabinetmaker and carpenter. Topics include: wood and wood products, furniture, cabinet and pattern making, residential construction, tool safety and career information. The instructor's manual and student workbook include teaching strategies, questions and problems that reinforce and enrich materials in the text.</p>	1070 1120 1130 1140 1180	2010 2020 2040 2060 2130 2140 2160 to 2190	3010 3050 3060 3120 3130 3140 3160 3210
LRDC	<p><i>Technology Shaping Our World.</i> John Gradwell, Malcolm Welch and Eugene Martin. Goodheart-Willcox Co., Inc., Copp Clark Longman, 1996.</p> <p>Introduces students to modern technology. Organizes learning so that students progress from planning to designing and communicating to applied activities within a technological system. Teachers should be aware that in the 1996 edition the student pictured on page 70 is not wearing the appropriate clothing and personal protective equipment. An instructor's guide is available.</p>	1010 1070 1120 1130 1160 1180	2010 2040 2050 2070 2080 2090 2190 2200	3190
LRDC	<p><i>Thompson's™ Woodworking Safety Handbook.</i> (2<sup>nd</sup> edition.) R. Thompson. Thompson Safety Handbooks Inc., 1996.</p> <p>This book is a comprehensive one-stop resource for information essential to workshop safety. Topics include: general safety issues; workshop design; personal protective equipment; safe use of hand and powered hand tools as well as stationary machine tools.</p>	1010 1070 1120 1130 1140 1160 1180	2040 2050 2120 to 2180	3040 3050 3060 3120 3130 3150 3160 3190



## SUPPORT LEARNING RESOURCES

Support learning resources are authorized by Alberta Education to assist in addressing some of the learner expectations of a module or components of modules.

Distributor Code	Resources	Levels/Module No.		
		1	2	3
LRDC	<i>Air Sealing Your House – From House to Home.</i> Outremont, PQ: Video Club of America. Video.  Presents basic principles and methods of air sealing a home.		2090	3030 3080
LRDC	<i>Art of Construction, The: Projects and Principles for Beginning Engineers and Architects.</i> Mario Salvadori. Chicago, IL: Chicago Review Press, 1990.  Draws on examples from the past and present to explain the principles of construction. Student activities have been identified to create durable and engaging projects.	1010 1070 1160	2040 2050 2100	
LRDC	<i>Avoiding Concrete Problems.</i> (Builders Series.) Canada Mortgage and Housing Corporation, 1987. Video.  Repairs to concrete foundation walls and floors can be costly to repair. This objective video clearly demonstrates techniques that help builders avoid or reduce their problems.	1070	2010 2020	3010 3020
LRDC	<i>Avoiding Drywall Problems.</i> (Builders Series.) Canada Mortgage and Housing Corporation. Video.  Cracks and nail are common problems related to drywalling. This video identifies some of the most common things that go wrong, examines the causes and suggests how to solve them.		2040 2050	3050
LRDC	<i>Avoiding Wood Frame Construction Problems.</i> (Builders Series.) Canada Mortgage and Housing Corporation, 1994. Video.  There is often a simple reason why floors squeak, roofs sag and doors stick. This video demonstrates ways to avoid floor, wall and roof framing problems.		2040	3030
LRDC	<i>Basic Carpentry – Hands-on Series: Home Improvement Video.</i> Windmill Point Oriental, NC: D.I.Y. Video Corp. Do It Yourself, Inc. Video.  Presents basic tools and techniques used on typical carpentry projects.	1010 1120 1130 1140 1160		
LRDC	<i>Basic Insulation Projects – From House to Home.</i> Outremont, PQ: Video Club of America. Video.  Describes basic insulating techniques used in the home.		2060 2080	



# Support Learning Resources (continued)

Distributor Code	Resources	Levels/Module No.		
		1	2	3
LRDC	<p><i>Building Bookcases – Hands-on Series: Woodworking.</i> Windmill Point Oriental, NC: D.I.Y. Video Corp. Do It Yourself, Inc. Video.</p> <p>Provides time-saving techniques related to bookcase construction.</p>	1160	2160 2170	
LRDC	<p><i>Building Cabinets – Hands-on Series: Woodworking.</i> Windmill Point Oriental, NC: D.I.Y. Video Corp. Do It Yourself, Inc. Video.</p> <p>A step-by-step video that covers basic box-type construction techniques.</p>	1160	2130 2160 2170	3160
LRDC	<p><i>Building Tables – Hands-on Series: Woodworking.</i> Windmill Point Oriental, NC: D.I.Y. Video Corp. Do It Yourself, Inc. Video.</p> <p>Provides suggestions to overcome common mistakes and problems associated with table construction.</p>	1130 1160		3130
LRDC	<p><i>Canadian Wood-Frame House Construction: Second Metric Edition.</i> Ottawa, ON: CMHC Publication, 1988.</p> <p>Describes how wood-frame houses are put together in Canada. Presents the most commonly employed construction methods and provides suggestions for the selection of suitable materials for house construction. Please note this text has been reprinted in 1989, 1991 and 1992.</p>	1070	2010 to 2090	3010 to 3080 3110
ACC	<p><i>Career and Technology Studies: Key Concepts.</i> Edmonton, AB: ACCESS: The Education Station.</p> <p>A series of videos and utilization guides relevant to all CTS strands. The series consists of: <i>Anatomy of a Plan; Creativity; Electronic Communication; The Ethics Jungle; Go Figure; Innovation; Making Ethical Decisions; Portfolios; Project Planning; Responsibility and Technical Writing.</i></p>	all	all	all
LRDC	<p><i>Carpenter's Manifesto, The.</i> (Revised and updated.) Jeffrey Ehrlich and Marc Mannheimer. New York, NY: Henry Holt and Company, 1990.</p> <p>Presents an analyses of structural principles. Shows how wood and other building materials can be made into useful products.</p>	1010 1120 1130 1160	2130 2140 2160 2170	3120 3170
LRDC	<p><i>Carpentry and Building Construction.</i> (5<sup>th</sup> edition.) J. Feirer et al. Glencoe/McGraw-Hill, 1997. Workbook.</p> <p>See Basic Learning Resources for module correlation and annotation.</p>			



## Support Learning Resources (continued)

Distributor Code	Resources	Levels/Module No.		
		1	2	3
LRDC	<p><i>Concrete Formwork.</i> Leonard Koel. Homewood, IL: American Technical Publishers, Inc., 1988.</p> <p>Provides information on safe construction of concrete forms for residential and light construction application. Also covers print reading, concrete placement and finishing.</p>		2010 2020	3010 3100
LRDC	<p><i>Concrete Technology.</i> (3<sup>rd</sup> edition.) George R. White. Delmar Publishers Inc., 1991.</p> <p>The text is based on the fundamentals of concrete work. Information is focused on an understanding of cement and concrete products as applied in construction work.</p>	1180	2020	3010 3020
LRDC	<p><i>Construction Systems.</i> Robert Weisbach, et al. Goodheart-Willcox Company. Irwin Publishing, 1996. Text and Student Activity Manual.</p> <p>This resource introduces students to the construction industry by exploring its origin, impact on society, organization, and systems of production. Each chapter begins with a set of objectives, key terms and concludes with a set of review questions and activities. An instructor's manual is available.</p>	1070 1120 1160	2010 to 2050 2070 2080 2090 2120 2170 2190	3010 3030 3050 3080 3160
LRDC	<p><i>Construction Technology.</i> (3<sup>rd</sup> edition.) Mark W. Huth. Thompson Learning Tools. ITP Nelson Canada, 1996.</p> <p>Introduces students to the construction industry – how it is organized and controlled, its impact on society and opportunities for employment.</p>	1010 1070	2010 to 2090	3010 3020 3050 3070 3110 3120 3170
LRDC	<p><i>Construction Technology: Today and Tomorrow.</i> James F. Fales. Mission Hills, CA: Glencoe/McGraw-Hill, 1991. Student Text and Workbook.</p> <p>A comprehensive text that builds the student's understanding of the construction industry. Features health and safety issues and integrates basic academic skills.</p>	1010 1070	2010 to 2090	3010 3020 3050 3070 3110 3120 3170
LRDC	<p><i>Design and Technology.</i> Kathy Browning, et al. Toronto, ON: McGraw-Hill Ryerson Limited, 1993.</p> <p>Explores structures, energy, machines, materials and fabrication processes with an emphasis on designing, decision making and problem solving.</p>	1010 1070 1120 1130 1140 1200	2120 2200	



## Support Learning Resources (continued)

Distributor Code	Resources	Levels/Module No.		
		1	2	3
LRDC	<p><i>Exploring Woodworking: Fundamentals of Technology.</i> Fred W. Zimmerman and Larry J. McWard. South Holland, IL: Goodheart-Willcox Co. Inc., 1993. Workbook.</p> <p>See Basic Learning Resources for module correlation and annotation.</p>			
LRDC	<p><i>Furniture Refinishing Made Easy.</i> D. Sands. Lone Pine Publishing, 1992.</p> <p>This resource deals with a variety of finishing/refinishing topics including work environment safety, furniture and casework cleaning, stripping, sanding, painting, staining and waxing. The book uses black and white illustrations throughout and contains a useful glossary of terms.</p>		2150	3150
LRDC	<p><i>Homes Today and Tomorrow.</i> (5<sup>th</sup> edition.) R.F. Sherwood. Glencoe/McGraw-Hill, 1997. Text and Student Workbook.</p> <p>A colorful well illustrated text on housing and interior design. Topics include housing needs, housing styles, consumer concerns, construction methods, elements and principles of design, planning interiors and applying design and construction principles. The resource has a strong career focus with interviews with practising designers, links from the classroom to the workplace and "Design Challenge" activities to help students build portfolios. A teacher's annotated edition is available.</p>	1070	2070 2080 2090	3090 3150 3170
LRDC	<p><i>Installing Ventilation Properly – From House to Home.</i> Outremont, PQ: Video Club of America. Video.</p> <p>Show how air quality affects comfort and cost of heating/cooling a home.</p>		2100	3100
LRDC	<p><i>Layman's Guide to Contracting Your Own Home, The. A Step-By-Step Guide.</i> D. Caldwell. Designs by Caldwell, 1994.</p> <p>This is a step-by-step guide on being your own contractor. It includes design, approvals for estimates and project management.</p>	1070	2010 2020 2030 2060	
LRDC	<p><i>Manufacturing Technology.</i> Stanley A. Komacek. Albany, NY: Delmar Publishers Inc., 1990.</p> <p>Introduces student to manufacturing; identifies how natural resources are processed and made into finished products. Also describes how industry is organized and the roles people play within it.</p>	1010 1120 1130 1160 1180 1200	2190 2200	3190 3200



# Support Learning Resources (continued)

Distributor Code	Resources	Levels/Module No.		
		1	2	3
LRDC	<p><i>Manufacturing Technology: Today and Tomorrow.</i> Robert A. Daiber and Thomas L. Erikson. Mission Hills, CA: Glencoe McGraw Hill, 1991.</p> <p>Features a hands-on approach that introduces student to the manufacturing industry. This resource helps students discover how materials, tools and processes are used in manufacturing. It also correlates math, language arts, science and social studies skills through review activities.</p>	1010	2190	3120
		1120	2200	3190
		1130		3200
		1160		
		1180		
LRDC	<p><i>Modern Carpentry: Building Construction Details in Easy-to-Understand Form.</i> Willis H. Wagner and H. Smith. Goodheart-Willcox Co., Inc., Irwin Publishing, 1996. Workbook.</p> <p>See Basic Learning Resources for module correlation and annotation.</p>			
LRDC	<p><i>Modern Plumbing.</i> Keith E. Blankenbaker. South Holland, IL: Goodheart-Willcox Co. Inc., 1992.</p> <p>Provides basic information on materials, tools and processes related to residential plumbing and heating systems.</p>		2080 2090	3080 3110
LRDC	<p><i>Modern Woodworking.</i> W. Wagner and H. Smith. Goodheart-Willcox Co., Inc., Irwin Publishing, 1996. Workbook.</p> <p>See Basic Learning Resources for module correlation and annotation.</p>			
LRDC	<p><i>Ortho's Basic Home Building: An Illustrated Guide.</i> San Ramon, CA: Chevron Chemical Company, 1991.</p> <p>Presents all the steps of building a new house – from obtaining permits to construction as well as preparing the house for final painting, flooring and decorating.</p>	1070	2010 2020 2040 to 2090	3010 to 3060 3110 3170
LRDC	<p><i>Ortho's Home Improvement Encyclopedia: Problem Solving From A to Z (Revised Edition).</i> A. Ahlstrand. San Ramon, CA: Fitzhenry &amp; Whiteside, Monsanto Co., 1994.</p> <p>Covers basic aspects of planning, designing, building, remodeling, repairing and home improvement projects.</p>	1070 1130	2010 2020 2040 to 2090 2150 2160 2170	3010 to 3070 3090



# Support Learning Resources (continued)

Distributor Code	Resources	Levels/Module No.		
		1	2	3
LRDC	<i>Plastic Piping Systems.</i> (2 <sup>nd</sup> edition.) David A. Chasis. New York, NY: Industrial Press. Inc., 1988. Technical Reference Book.  Provides a comprehensive look at plastic materials and piping applications.		2080	3100
LRDC	<i>Principles and Practices of Heavy Construction.</i> (4 <sup>th</sup> edition.) Ronald C. Smith and Cameron K. Andres. Englewood Cliffs, NJ: Regents/Prentice Hall, 1993.  An advanced level text that focuses on the materials and processes used in heavy construction. Uses Canadian standards.		2010 2020	3010 3020 3050 3100 3110
LRDC	<i>Production Technology.</i> Stanley A. Komacek. Albany, NY: Delmar Publishers Inc., 1993. Student Text.  Offers a broad exploration of the tools, materials and processes of production. Demonstrates how production technology affects and is affected by science and math.	1010 1070 1120 1130 1140 1160 1180 1200	2010 to 2060 2120 2190 2200	3010 3020 3030 3060 3070 3200
LRDC	<i>Structures With Materials</i> (GCSE Technology.) S. Rich. Stanley Thornes (Publishers) Ltd., 1991.  Applies a problem-solving approach to the "harder" end of technology. Activities are designed for both individual and group settings. Teachers should be aware that a potential community concern may exist regarding the topic of evolution (page 32).	1010 1070 1120	2020 2030 2040 2050	3020 3090
LRDC	<i>Technology: Today &amp; Tomorrow.</i> (3 <sup>rd</sup> edition.) J. Fales and V. Kuetemeyer, et al. Glencoe/McGraw-Hill, 1997. Text and Student Workbook.  This resource deals with five important areas of technology – communication, manufacturing, transportation, construction and biotechnology. In addition, the problem solving process is defined, parts of a technological system are explained and curricular and cross-curricular activities are provided. Imperial measurements are used throughout this resource. Teacher's annotated edition, teacher's resource binder, making connections and media correlations are available.	1010 1070 1120	2190 2200	
LRDC	<i>Ventilation and Heating Projects – From House to Home.</i> Outremont, PQ. Video Club of America. Video.  Explain how to balance a central forced air furnace so that even temperatures are achieved throughout a house.		2090	3030 3080



## TEACHING RESOURCES

The following teaching resources are authorized by Alberta Education to assist teachers in the instructional process.

Distributor Code	Resources	Levels/Module No.		
		1	2	3
LRDC	<i>Carpentry and Building Construction</i> . (5 <sup>th</sup> edition.) J. Feirer, et al. Glencoe/McGraw-Hill, 1997. Instructor's Resource Guide.  See Basic Learning Resources for module correlation and annotation.			
LRDC	<i>Chisels on a Wheel: A Comprehensive Reference to Modern Woodworking Tools and Materials</i> . Jim Effner. Prakken Publications, Inc., 1992. Teacher's Resource.  A comprehensive reference to modern woodworking tools and materials.	1130 1160	2130 2140 2160 2170	3130 to 3190
LRDC	<i>Construction Systems</i> . Robert Weisbach, et al. Goodheart-Willcox Company. Irwin Publishing, 1996. Instructor's Manual.  See Support Learning Resources for module correlation and annotation.			
LRDC	<i>Construction Technology</i> . (3 <sup>rd</sup> edition.) Mark W. Huth. Thomson Learning Tools. ITP Nelson Canada, 1996. Instructor's Guide.  See Support Learning Resources for module correlation and annotation.			
LRDC	<i>Construction Technology: Today and Tomorrow</i> . James F. Fales. Mission Hills, CA: Glencoe/McGraw-Hill, 1991. Teacher's Annotated Edition and Teacher's Resource Binder.  See Support Learning Resources for module correlation and annotation.			
LRDC	<i>Design and Technology</i> . Kathy Browning, et al. Toronto, ON: McGraw-Hill Ryerson Limited, 1994. Teacher's Resource.  See Support Learning Resources for module correlation and annotation.			
PSK	<i>Electric Code Simplified</i> . (4 <sup>th</sup> edition.) P.S. Knight. Richmond, BC: P.S. Knight Co. Ltd., 1988.  A simplified version of the Canadian Electrical Code associated with residential construction.		2010 2040 2050 2070	3110



# Teaching Resources (continued)

Distributor Code	Resources	Levels/Module No.		
		1	2	3
LRDC	<p><i>Exploring Woodworking: Fundamentals of Technology.</i> Fred W. Zimmerman and Larry J. McWard. South Holland, IL: Goodheart-Willcox Co. Inc., 1993. Instructor's Guide and Answer Key.</p> <p>See Basic Learning Resources for module correlation and annotation.</p>			
LRDC	<p><i>Heat Kit, The – Home Energy Analysis and Tutorial.</i> Edmonton, AB. Alberta Energy - Energy Efficiency Board.</p> <p>Information and skill building tutorial on energy efficient house.</p>		2040	3030 3080
LRDC	<p><i>Homes Today and Tomorrow.</i> (5<sup>th</sup> edition.) R.F. Sherwood. Glencoe/McGraw-Hill, 1997. Teacher's Annotated Edition.</p> <p>See Support Learning Resources for module correlation and annotation.</p>			
LRDC	<p><i>Living With Technology.</i> (2<sup>nd</sup> edition.) Michael Hacker, and Robert Barden. Albany, NY: Delmar Publishers Inc., 1993. Teacher's Resource Guide.</p> <p>See Basic Learning Resources for module correlation and annotation.</p>			
SAIT	<p><i>Manual Hand Tools: A Visual Data Base.</i> Calgary, AB: Educational Resource Department, Southern Alberta Institute of Technology. Videodisk and index.</p> <p>Contains photos of over 700 manual hand tools in 50 different classifications, plus motion sequences focusing on 38 tools. Also contains an alphabetical index of tool names, frame numbers and short description of each frame. Can be used with Hypercard.</p>	all	all	all
LRDC	<p><i>Modern Carpentry: Building Construction Details in Easy-to-Understand Form.</i> Willis H. Wagner. Goodheart-Willcox Co., Inc., Irwin Publishing, 1996. Instructor's Manual and Answer Key; Teacher's Resource Manual and Transparencies.</p> <p>See Basic Learning Resources for module correlation and annotation.</p>			
LRDC	<p><i>Modern Woodworking.</i> W. Wagner and H. Smith. Goodheart-Willcox Co., Inc., Irwin Publishing, 1996. Instructor's Guide.</p> <p>See Basic Learning Resources for module correlation and annotation.</p>			



## Teaching Resources (continued)

Distributor Code	Resources	Levels/Module No.		
		1	2	3
LRDC	<p><i>Technology Shaping Our World.</i> John Gradwell, Malcolm Welch and Eugene Martin. South Holland, IL: Goodheart-Willcox Co., Inc., 1996. Instructor's Manual.</p> <p>See Basic Learning Resources for module correlation and annotation.</p>			
LRDC	<p><i>Technology: Today &amp; Tomorrow.</i> (3<sup>rd</sup> edition.) J. Fales and V. Kuetemeyer, et al. Glencoe/McGraw-Hill, 1997. Teacher's Annotated Edition; Teacher's Resource Binder (NOTE: Authors are C. Haller &amp; E. Thompson); Making Connections; Media Correlations.</p> <p>See Support Learning Resources for annotation and module correlation.</p>			







## CONSTRUCTION TECHNOLOGIES RESOURCES

**THEME CODE:**

- A. Building Systems:**  
(Processes and Applications)
- B. Manufacturing Systems**  
(Processes and Applications)

**FORMAT CODE:**

p - Print  
v - Video  
s - Software  
vd - videodisk

**STATUS CODE:**

**B - Basic**  
**S - Support**  
**T - Teaching**

**LEVEL CODE:**

1 - Introductory  
2 - Intermediate  
3 - Advanced

**JR/SR HIGH CODE:**

J - Junior High  
S - Senior High

[illegible]















## OTHER RESOURCES

These titles are provided as a service only to assist local jurisdictions to identify resources that contain potentially useful ideas for teachers. Alberta Education has done a preliminary review of the resources. However, the responsibility to evaluate these resources prior to selection rests with the user, in accordance with any existing local policy.

Distributor Code	Other Resources	Levels/Module No.		
		1	2	3
LRDC	<i>Alberta Building Code.</i> Edmonton, AB: Alberta Labour.	1070	2010 to 2090	3010 to 3110 3210
AECD	<i>Apprenticeship Training: Carpenter and Cabinetmaker Programs.</i> Edmonton, AB: Alberta Advanced Education and Career Development, Apprenticeship and Trade Certification. Curriculum Outline.  Describes the parameters for apprenticeship and course requirements for each period of technical training.	all	all	all
AECD	<i>Carpenter Apprenticeship Program, 1st and 2<sup>nd</sup> Year.</i> Edmonton, AB: Alberta Advanced Education and Career Development.  Set of competency-based program materials covering the theory and practical components for the first period and second period of the carpentry program.	1010 1070	2010 to 2060	3010 to 3110 3210
AHBA	<i>Code and Construction Guide for Housing.</i> Edmonton, AB: Alberta Home Builders' Association, Inc.  Assists in reading and interpretation of building code regulations.	1070	2010 to 2090	3010 to 3100 3210
CMH	<i>Concrete Foundations – Builders' Series.</i> Ottawa, ON: CMHC Publication, 1988. Booklet  Identifies causes and provides solutions to problems in foundation walls, basement and garage slabs.		2020	3010
CMH	<i>Construction and the Environment – Renovators' Series.</i> Ottawa ON: CMHC Publication, 1993. Booklet.  The purpose of this booklet is to demonstrate to builders and renovators the need for environmental pro-action.	all	all	all
AFRD	<i>Corrals for Handling Beef Cattle.</i> Edmonton, AB: Agriculture, Food and Rural Development.  Provides plans for a variety of corrals and buildings used in agriculture.		2100	



# Other Resources (continued)

Distributor Code	Other Resources	Levels/Module No.		
		1	2	3
CMH	<i>Door and Window Installation – Builders’ Series.</i> Ottawa ON: CMHC Publication, 1988. Booklet.  Covers the installation of exterior and interior doors, patio doors and fixed and operating window units.		2060	3060
CMH	<i>Drywall Applications – Builders’ Series.</i> Ottawa, ON: CMHC Publication, 1990. Booklet.  Identifies causes and provides solutions to problems related to drywall applications.			3030
CMH	<i>Glossary of House – Building and Site – Development Terms, A.</i> Ottawa, ON: CMHC Publication, 1982.  Glossary terms used in the building construction industry.		2010	
CCA	<i>Guide to Site Construction Safety, A.</i> Calgary, AB: Calgary Construction Association. Booklet.  This booklet informs workers of their personal responsibilities towards safety in construction. It covers a wide variety of issues related to worker safety in the field and in the office.			3100 3110
CMH	<i>Moisture Problems – Builders’ Series.</i> Ottawa ON: CMHC Publication, 1988. Booklet.  Helps builders understand what causes moisture problems in buildings, how to repair them and how to avoid them.		2020 2030	3010
CMH	<i>Noise Control – Builders’ Series.</i> Ottawa ON: CMHC Publication, 1989. Booklet.  Identifies some of the causes of noise transfer and methods of control.		2040	3210
PAB	<i>Occupational Health and Safety Act.</i> Edmonton, AB: Queen’s Printer.	all	all	all
CMH	<i>Preserved Wood Foundation – Builders’ Series.</i> Ottawa ON: CMHC Publication, 1987. Booklet.  Presents some of the potential problems that may be faced by builders unfamiliar with preserved wood foundations.		2030	



## Other Resources (continued)

Distributor Code	Other Resources	Levels/Module No.		
		1	2	3
CMH	<i>Project Manager Communication – Renovators’ Series.</i> Ottawa ON: CMHC Publication, 1991. Booklet.  Outlines a systematic approach to managing renovation projects.			3110
CMH	<i>Renovation: Avoiding Renovation Hazards.</i> Ottawa ON: CMHC Publication, 1990. Booklet.  A quick reference guide for renovators. Contains more than 60 references to various hazards associated with residential renovations			3090
CMH	<i>Renovator’s Resource Guide.</i> Ottawa ON: CMHC Publication, 1995. Booklet.  Provides renovators with information relating to the business aspects of renovation.	all	all	all
CMH	<i>Roofing and Flashing Problems – Builders’ Series.</i> Ottawa ON: CMHC Publication, 1988. Booklet.  Provides the builder with a diagnosis of common roofing and flashing problems.		2050	3040
ACC	<i>Step by Step Series.</i> Edmonton, AB: ACCESS: The Education Station.  A series of 10-minute video programs that use computer graphics to help teach the fundamental principles of stair design.			3040
CMH	<i>Siding Problems – Builders’ Series.</i> Ottawa ON: CMHC Publication, 1988. Booklet.  Provides the builder with a diagnosis of common siding problems.		2060	
AECD	<i>Trade Profile.</i> Edmonton, AB: Alberta Advanced Education and Career Development.  Provides up-to-date information on trades related to Construction Technologies.	all	all	all



## ADDITIONAL SOURCES

Available to Career and Technology Studies (CTS) teachers, locally and provincially, are many sources of information that can be used to enhance CTS. These sources are available through the community (e.g., libraries, boards, committees, clubs, associations) and through government agencies, resource centres and organizations. Some sources, e.g., government departments, undergo frequent name and/or telephone number changes. Please consult your telephone directory or an appropriate government directory.

The following is a partial list of sources to consider:

### TEACHER-LIBRARIANS

Planned and purposeful use of library resources helps students grow in their ability to gather, process and share information. Research activities require access to an adequate quantity and variety of appropriate, up-to-date print and nonprint resources from the school library, other libraries, the community and additional sources. Some techniques to consider are:

- planning together
- establishing specific objectives
- integrating research skills into planning.

Cooperation between the teacher-librarian and the subject area teacher in the development of effectively planned resource-based research activities ensures that students are taught the research skills as well as the subject content. Also see *Focus on Research: A Guide to Developing Student's Research Skills* referenced in the Alberta Education resources section.

### ALBERTA EDUCATION SOURCES

Alberta Government telephone numbers can be reached toll free from outside Edmonton by dialing 310-0000.

The following monographs are available for purchase from the Learning Resources Distributing Centre. Refer to the Distributor Directory at the end of this section for address, telephone, fax and Internet address.

Please consult the "Support Documents" section or the "Legal, Service and Information Publications" section in the LRDC *Buyers Guide* for ordering information and costs.

#### Developmental Framework Documents

- *The Emerging Student: Relationships Among the Cognitive, Social and Physical Domains of Development*, 1991 (Stock No. 161555)

This document examines the child, or student, as a productive learner, integrating all the domains of development: cognitive, social and physical. It emphasizes the need for providing balanced curriculum and instruction.

- *Students' Interactions Developmental Framework: The Social Sphere*, 1988 (Stock No. 161399)

This document examines children's perceptual, structural and motor development and how such physical development affects certain learning processes.



- *Students' Physical Growth: Developmental Framework Physical Dimension*, 1988 (Stock No. 161414)

This document examines children's normal physical growth in three areas: perceptual, structural and motor development. In none of these areas is the child's growth in a single continuous curve throughout the first two decades of life. Physical growth is characterized by periods of rapid growth and periods of slower growth. Consequently, differences and changes in growth patterns may affect the timing of certain learning processes.

#### Other

- *Focus on Research: A Guide to Developing Students' Research Skills*, 1990 (Stock No. 161802)

This document outlines a resource-based research model that helps students manage information effectively and efficiently, and gain skills that are transferable to school and work situations. This model provides a developmental approach to teaching students how to do research.

- *Teaching Thinking: Enhancing Learning*, 1990 (Stock No. 161521)

Principles and guidelines for cultivating thinking, ECS to Grade 12, have been developed in this resource. It offers a definition of thinking, describes nine basic principles on which the suggested practices are based, and discusses possible procedures for implementation in schools and classrooms.

#### ACCESS: The Education Station

ACCESS: The Education Station offers a variety of resources and services to teachers. For a nominal dubbing and tape fee, teachers may have ACCESS: The Education Station audio and video library tapes copied. ACCESS: The Education Station publishes listings of audio and video cassettes as well as a comprehensive programming schedule.

Of particular interest are the CTS videos, which are available with utilization guides. The guides outline key points in each video and suggest questions for discussion, classroom projects and other activities. Video topics are listed in the Support Learning Resources section of this guide. The videos and accompanying support material can be obtained from ACCESS: The Education Station. Refer to the Distributor Directory at the end of this section for address, telephone, fax and Internet address.

### GOVERNMENT SOURCES

#### National Film Board of Canada (NFB)

The NFB has numerous films and videotapes that may be suitable for Career and Technology Studies strands. For a list of NFB films and videotapes indexed by title, subject and director, or for purchase of NFB films and videotapes, call 1-800-267-7710 (toll free) or Internet address: <http://www.nfb.ca>

ACCESS: The Education Station and some school boards have acquired duplication rights to some NFB videotapes. Please contact ACCESS: The Education Station or consult the relevant catalogues in your school or school district.

The Edmonton Public Library and the Calgary Public Library have a selection of NFB films and videotapes that can be borrowed free of charge with a Public Library borrower's card. For further information, contact:

Edmonton Public Library  
Telephone: 403-496-7000

Calgary Public Library  
Telephone: 403-260-2650

For further information contact:

#### Statistics Canada

Regional Office  
8th Floor, Park Square  
10001 Bellamy Hill  
Edmonton, AB T5J 3B6  
Telephone: 403-495-3027  
Fax: 403-495-5318

Internet address: <http://www.statcan.ca>

Statistics Canada produces periodicals, reports, and an annual year book.



## **Resource Centres**

### ***Urban Resource Centres***

#### **Instructional Services**

Elk Island Public Schools  
2001 Sherwood Drive  
Sherwood Park, AB T8A 3W7  
Telephone: 403-464-8235  
Fax: 403-464-8033  
Internet Address: <http://ei.educ.ab.ca>

#### **Learning Resources Centre**

Red Deer Public School Board  
4747 - 53 Street  
Red Deer, AB T4N 2E6  
Telephone: 403-343-8896  
Fax: 403-347-8190

#### **Instructional Materials Centre**

Calgary Separate School Board  
6220 Lakeview Drive SW  
Calgary, AB T3E 5T1  
Telephone: 403-298-1679  
Fax: 403-249-3054

#### **School, Student, Parent Services Unit**

Program and Professional Support Services  
Sub Unit  
Calgary Board of Education  
3610 - 9 Street SE  
Calgary, AB T2G 3C5  
Telephone: 403-294-8542  
Fax: 403-287-9739

After July 1, 1997, please contact the School, Student, Parent Services Unit regarding the relocation of the Loan Pool Resource Unit.

#### **Learning Resources**

Edmonton Public School Board  
Centre for Education  
One Kingsway Avenue  
Edmonton, AB T5H 4G9  
Telephone: 403-429-8387  
Fax: 403-429-0625

#### **Instructional Materials Centre**

Medicine Hat School District No. 76  
601 - 1 Avenue SW  
Medicine Hat, AB T1A 4Y7  
Telephone: 403-528-6719  
Fax: 403-529-5339

#### **Resource Centre**

Edmonton Catholic Schools  
St. Anthony's Teacher Centre  
10425 - 84 Avenue  
Edmonton, AB T6E 2H3  
Telephone: 403-439-7356  
Fax: 403-433-0181

#### **Instructional Media Centre**

Northern Lights School Division No. 69  
Bonnyville Centralized High School  
4908 - 49 Avenue  
Bonnyville, AB T9N 2J7  
Telephone: 403-826-3366  
Fax: 403-826-2959

### ***Regional Resource Centres***

#### **Zone 1**

Zone One Regional Resource Centre  
P.O. Box 6536  
10020 - 101 Street  
Peace River, AB T8S 1S3  
Telephone: 403-624-3187  
Fax: 403-624-5941

#### **Zone 2/3**

Central Alberta Media Services (CAMS)  
182 Sioux Road  
Sherwood Park, AB T8A 3X5  
Telephone: 403-464-5540  
Fax: 403-449-5326

#### **Zone 4**

Information and Development Services  
Parkland Regional Library  
5404 - 56 Avenue  
Lacombe, AB T4L 1G1  
Telephone: 403-782-3850  
Fax: 403-782-4650  
Internet Address: <http://rtt.ab.ca.rtt/prl/prl.htm>



## **Zone 5**

South Central Alberta Resource Centre (SCARC)  
Golden Hills Regional Division  
435A Hwy 1  
Westmount School  
Strathmore, AB T0J 3H0  
Telephone: 403-934-5028  
Fax: 403-934-5125

## **Zone 6**

Southern Alberta Learning Resource Centre (SALRC)  
Provincial Government Administration Building  
909 Third Avenue North, Room No. 120  
Box 845  
Lethbridge, AB T1J 3Z8  
Telephone: 403-320-7807  
Fax: 403-320-7817

## **OTHER GOVERNMENT SOURCES**

### **Alberta Agriculture**

Print Media Branch  
7000 – 113 Street  
Edmonton, AB T6H 5T6  
Telephone: 403-427-2127  
Toll Free: 1-800-292-5697  
Fax: 403-427-2861

### **Alberta Labour**

9940 – 106 Street  
Edmonton, AB T5K 2N2  
Telephone: 403-427-8848  
Fax: 403-427-0999

Offices are also in Calgary, Camrose, Edson, Fort McMurray, Grande Prairie, Lethbridge, Medicine Hat, Red Deer and Vermilion.

### **Canada Mortgage and Housing Corporation**

700 Montreal Road  
Ottawa, ON K1A 0P7  
www.cmhc.schl.gc.ca

CMHC distributes a wide range of documents related to house construction.

## **OTHER ORGANIZATIONS**

### **Alberta Building Trades Council**

201, 11738 Kingsway Avenue  
Edmonton, AB T5G 0X5

### **Alberta Construction Safety Association**

10949 – 120 Street  
Edmonton, AB T5H 3R2

### **Alberta Home Builders Association**

205, 10544 – 114 Street  
Edmonton, AB T5H 3J7

### **Alberta Teachers' Association**

Website: [www.teachers.ab.ca](http://www.teachers.ab.ca)  
Barnett House  
11010 – 142 Street  
Edmonton, AB T5N 2R1  
Telephone: 1-800-232-7208  
403-453-2411  
Fax: 403-455-6481

### *CTS Council*

*Alberta Global Education Project  
Science Council*

### **American Vocational Association**

1410 King Street  
Alexandria, VA 22314

### **Canadian Construction Association**

85 Albert Street  
Ottawa, ON K1P 6A4

### **Canadian Vocational Association**

P.O. Box 3435 Station D  
Ottawa, ON K1P 6L4

### **International Technology Education Association**

1914 Association Drive  
Reston, VA 22091

### **Junior Achievement of Northern Alberta**

(Alberta north of Lacombe, and NWT)  
161, 10700 – 104 Avenue  
Edmonton, AB T5J 4S2

### **Junior Achievement of Southern Alberta**

(Lacombe and south)  
739 – 10 Avenue SW  
Calgary, AB T2R 0B3



**Merit Contractors**

10951 – 120 Street  
Edmonton, AB T5H 3R2

**Recycling Council of Alberta**

Box 40552  
Highfield Post Office  
Calgary, AB T2G 5G8

**Skills Canada Alberta**

10035 – 102 Avenue  
Edmonton, AB T5J 0E5  
Telephone: 403-493-2637  
Fax: 403-493-2649



## DISTRIBUTOR DIRECTORY

The entries in the Distributor Directory are arranged alphabetically by code.

CODE	Distributor/Address	Contact Via
ACC	ACCESS: The Education Station 3270 – 76 Avenue Edmonton, AB T6B 2N9	403-440-7777 Fax: 403-440-8899 1-800-352-8293 <a href="http://www.ccinet.ab.ca/access">http://www.ccinet.ab.ca/access</a>
AECD	Alberta Advanced Education and Career Development 10th Floor, Commerce Place 10155 – 102 Street Edmonton, AB T5H 4L5	403-427-8765
AFRD	Alberta Agriculture Publishing Branch 100A 7000 – 113 Street Edmonton, AB T6H 5T6	403-427-2121 Fax: 403-427-2861
AHBA	Alberta Home Builders Association 205, 10544 – 114 Street Edmonton, AB T5H 3J7	403-424-5890
CCA	Calgary Construction Association 2725 – 12 Street NE Calgary, AB T2E 7J2	403-291-3350
CMH	Canada Mortgage and Housing Corporation 700 Montreal Road Ottawa, ON K1A 0P7	613-748-2367 Fax: 613-748-4069
LRDC	Learning Resources Distributing Centre 12360 – 142 Street Edmonton, AB T5L 4X9	403-427-5775 Fax: 403-422-9750 <a href="http://ednet.edc.gov.ab.ca/lrdc">http://ednet.edc.gov.ab.ca/lrdc</a>
PAB	Alberta Public Affairs Bureau Queen's Printer Bookstore 11510 Kingsway Avenue Edmonton, AB T5G 2Y1	403-427-4952 Fax: 403-452-0668
PSK	P.S. Knight Co. Ltd. 9840 Seacote Road Richmond, BC V7A 4A5	604-277-7627 Fax: 604-277-5330



# CONSTRUCTION TECHNOLOGIES

## SECTION J: SAMPLE STUDENT LEARNING GUIDES

The following pages provide background information, strategies and a template for developing student learning guides. Also included at the end of this section are several sample student learning guides for Construction Technologies.

A student learning guide provides information and direction to help students attain the expectations defined in a specified CTS module. It is designed to be used by students under the direction of a teacher.

Many excellent student learning guides (SLGs) are available for use and/or are in the process of being developed. While Alberta Education provides a development template accompanied by some samples, most student learning guide development is being done by individuals and organizations across the province (e.g., school jurisdictions, specialist councils, post-secondary organizations). Refer to the *Career & Technology Studies Manual for Administrators, Counsellors and Teachers* (Appendix 11) for further information regarding student learning guide developers and sources.

**Note:** A student learning guide is not a self-contained learning package (e.g., Distance Learning Module), such as you might receive from the Alberta Distance Learning Centre (ADLC) or Distance Learning Options South (DLOS).

### TABLE OF CONTENTS

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SAMPLE STUDENT LEARNING GUIDES	
CON1010 Basic Tools & Materials .....	J.11
CON2010 Site Preparation .....	J.17
CON3040 Stair Construction .....	J.23



## BACKGROUND INFORMATION

A Student Learning Guide (SLG) is a presentation of information and direction that will help students attain the expectations defined in a specified CTS module. It is designed to be used by students under the direction of a teacher. A SLG is not a self-contained learning package such as you might receive from the Alberta Distance Learning Centre (ADLC) or Distance Learning Options South (DLOS).

Each SLG is based on curriculum and assessment standards as defined for a particular CTS module. Curriculum and assessment standards are defined in this document through:

- module and specific learner expectations (Sections D, E and F)
- assessment criteria and conditions (Sections D, E and F)
- assessment tools (Section G).

The SLG is written with the student in mind and makes sense to the student in the context of his or her CTS program. SLGs are designed to guide students through modules under the direction of the teacher. They can be used to guide:

- an entire class
- a small groups of students
- individual students.

In some instances, the Student Learning Guide may also be used as teacher lesson plans. When using SLGs as teacher lesson plans, it should be noted that they tend to be:

- learner-centred (versus teacher-directed)
- activity-based (versus lecture-based)
- resource-based (versus textbook-based).

### Components of a Student Learning Guide

The student learning guide format, as developed by Alberta Education, typically has *seven* components as described below.

#### 1. *Why Take This Module?*

This section provides a brief rationale for the work the student will do, and also establishes a context for learning (i.e., in relation to the strand, a life pursuit, a specific industry, etc.).

#### 2. *What Do You Need To Know Before You Start?*

In this section, prerequisite knowledge, skills and attitudes considered necessary for success in the module are identified. Prerequisites may include other modules from within the strand or from related CTS strands, as well as generic knowledge and skills (e.g., safety competencies, the ability to measure/write/draw, prior knowledge of basic information relevant to the area of study).

#### 3. *What Will You Know And Be Able To Do When You Finish?*

This information must parallel and reflect the curriculum and assessment standards as defined for the module. You may find it desirable to rewrite these standards in less formal language for student use.

#### 4. *When Should Your Work Be Done?*

This section provides a timeline that will guide the student in planning their work. The timeline will need to reflect your program and be specific to the assignments you give your students. You may wish to include a time management chart, a list of all assignments to be completed, and instructions to the student regarding the use of a daily planner (i.e., agenda book) to organize their work.

#### 5. *How Will Your Mark For This Module Be Determined?*

This section will interpret the assessment criteria and conditions, assessment standards, assessment tools and suggested emphasis as defined for the module within the context of the projects/tasks completed. Accepted grading practices will then be used to determine a percentage grade for the module—a mark not less than 50% for successful completion. (**Note:** A module is



“successfully completed” when the student can demonstrate ALL of the exit-level competencies or MLEs defined for the module.)

#### 6. *Which Resources May You Use?*

Resources considered appropriate for completing the module and learning activities are identified in this section of the guide. The resources may be available through the Learning Resources Distributing Centre (LRDC) and/or through other agencies. Some SLGs may reference a single resource, while others may reference a range of resources. Resources may include those identified in the Learning Resource Guide (Section I) as well as other sources of information considered appropriate.

#### 7. *Activities/Worksheets*

This section provides student-centred and activity-based projects and assignments that support the module learner expectations. When appropriately aligned with curriculum and assessment standards, successful completion of the projects and assignments will also indicate successful completion of the module.

### **Strategies for Developing Student Learning Guides**

Prior to commencing the development of a student learning guide, teachers are advised to obtain:

- the relevant Guide to Standards and Implementation
- the student learning guide template.

Information communicated to the student in the SLG must parallel and reflect the curriculum and assessment standards as defined for the module. Therefore, critical elements of the Guide to Standards and Implementation that need to be addressed throughout the SLG include:

- module and specific learner expectations
- assessment criteria and conditions
- assessment standards
- assessment tools.

Additional ideas and activities will need to be incorporated into the student learning guide. These can be obtained by:

- reflecting on projects and assignments you have used in delivering programs in the past
- identifying human and physical resources available within the school and community
- networking and exchanging ideas (including SLGs) with other teachers
- reviewing the range of resources (e.g., print, media, software) identified in the Learning Resource Guide (Section I) for a particular module/strand.

Copyright law must also be adhered to when preparing a SLG. Further information and guidelines regarding copyright law can be obtained by referring to the:

- *Copyright Act*
- *Copyright* and the *Can Copy Agreement*.

A final task in developing a student learning guide involves validating the level of difficulty/challenge/rigour established, and making adjustments as considered appropriate.

A template for developing student learning guides, also available on the Internet, is provided in this section (see “Student Learning Guide Template,” pages J.5–10). Several sample student learning guides are also provided in this section (see “Sample Student Learning Guides,” starting on page J.11).



# CAREER & TECHNOLOGY STUDIES

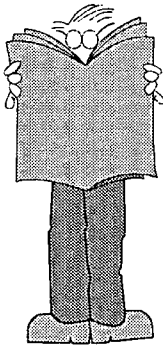


## SAMPLE STUDENT LEARNING GUIDE TEMPLATE



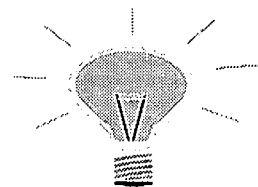
# WHY

**TAKE THIS MODULE?**

A large, empty rectangular box with a thin black border, intended for a student to write their reasons for taking the module.

# WHAT

**DO YOU NEED TO KNOW  
BEFORE YOU START?**

A large, empty rectangular box with a thin black border, intended for a student to write what they need to know before starting the module.



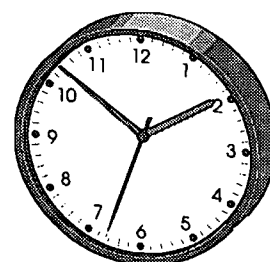
# WHAT

**WILL YOU KNOW AND  
BE ABLE TO DO  
WHEN YOU FINISH?**

- 
- 
- 
- 
- 
- 
- 
- 

# WHEN

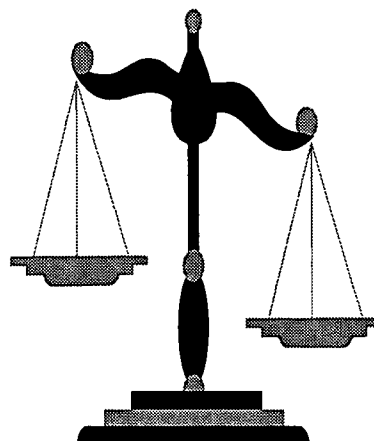
**SHOULD YOUR WORK BE DONE?**



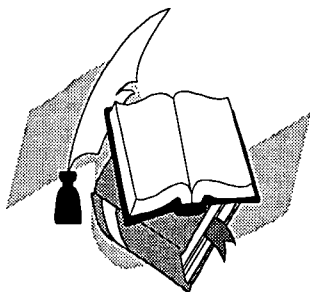


# HOW WILL YOUR MARK FOR THIS MODULE BE DETERMINED?

	PERCENTAGE



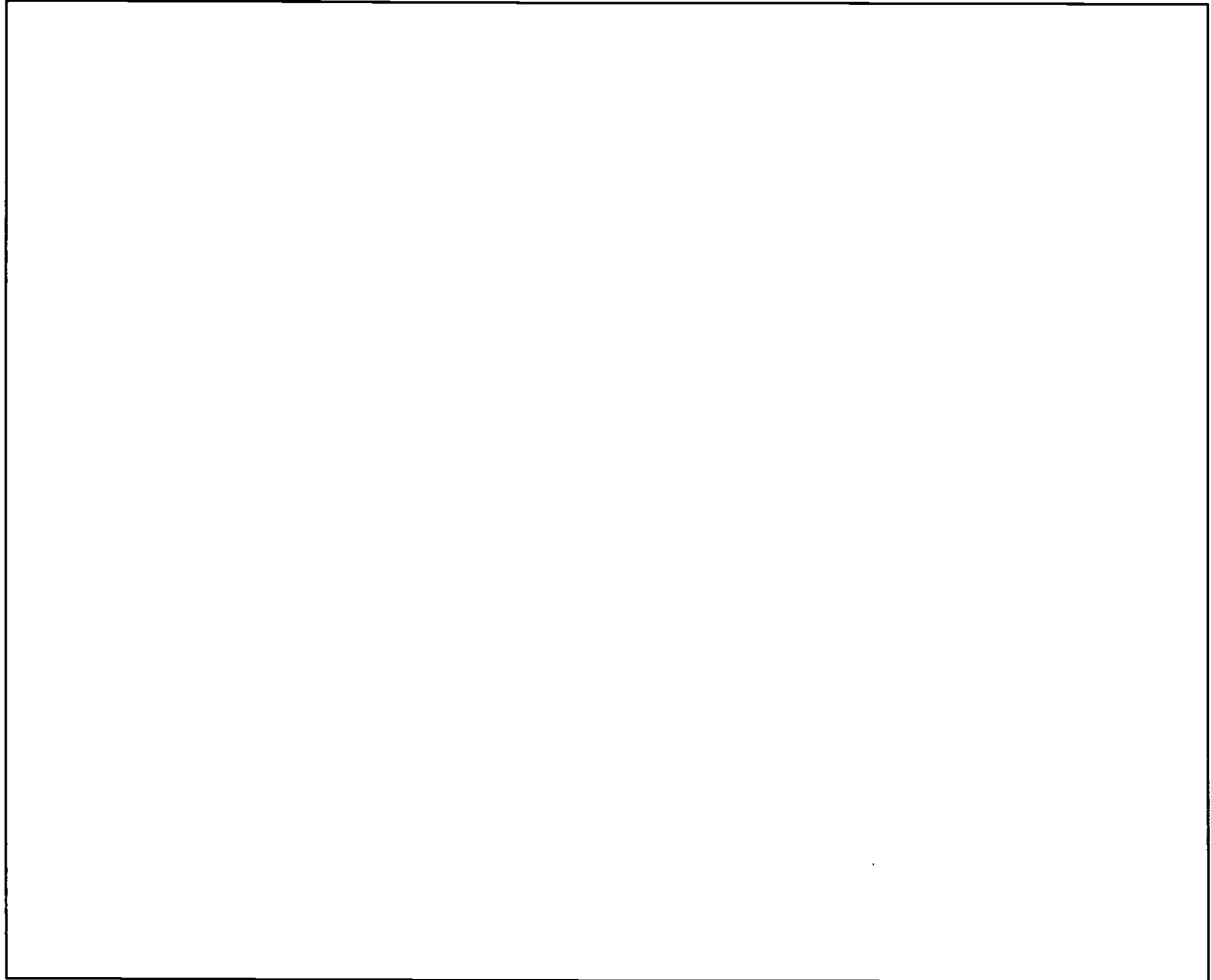
# WHICH RESOURCES MAY YOU USE?



- 
- 
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-



# ACTIVITIES/WORKSHEETS





# CAREER & TECHNOLOGY STUDIES

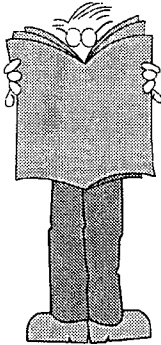
## CONSTRUCTION TECHNOLOGIES

### SAMPLE STUDENT LEARNING GUIDE

#### **CON1010 Basic Tools & Materials**



### WHY TAKE THIS MODULE?



Ever since the beginning of the Stone Age, people have used technology to build needed artifacts and structures.

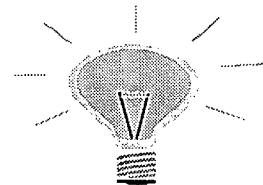
This module will:

- introduce you to common tools and materials
- help you understand the basic techniques used in building and manufacturing
- experience the satisfaction of constructing a lasting object.

### WHAT DO YOU NEED TO KNOW BEFORE YOU START?

There are no prerequisites identified for this module.

However, ability to read and follow directions and willingness to work with others in a safe manner will ensure your success.





# WHAT

**WILL YOU KNOW AND  
BE ABLE TO DO  
WHEN YOU FINISH?**

Upon completion of this module you will be able to:

- identify and describe the safe use of basic hand tools
- identify and compare the properties of common materials used in construction and fabrication activities
- apply construction/fabrication processes and skills to produce a product
- demonstrate basic competencies.

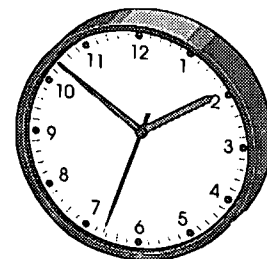
# WHEN

**SHOULD YOUR WORK BE DONE?**

Your teacher will give you a timeline for completing tasks and assignments within this module.

You may also wish to use a time-management planning chart to preplan the work that needs to be done in this module. Plan how you will use your class time as well as extra time needed to complete the assignments in this module.

Be sure to review the work to be completed in this module with your teacher and allot your time so that you will be able to finish within the suggested time frame.





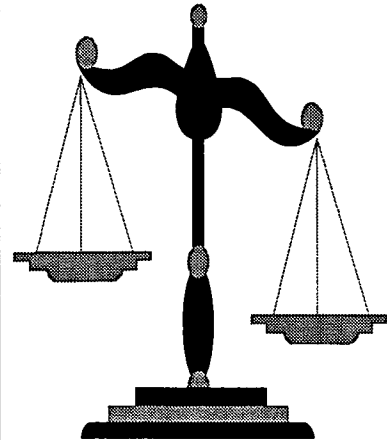
## CONSTRUCTION TECHNOLOGIES

### CON1010 Basic Materials & Tools

# HOW

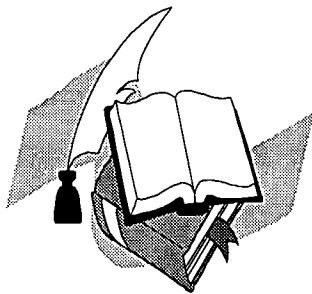
## WILL YOUR MARK FOR THIS MODULE BE DETERMINED?

	PERCENTAGE
<p>You must first demonstrate <b>all</b> of the competencies required for this module.</p> <p>When you have done this, your percentage mark for the module will be determined as follows:</p> <ul style="list-style-type: none"><li>• Tool Identification and Use Test (Hand Tools, CON1010-2)</li><li>• Report on the Properties of Building Materials (Material Identification, CON1010-3)</li><li>• Project Work (Project Assessment (CONPRO))</li></ul>	<p>15%</p> <p>15%</p> <p>70%</p>



# WHICH

## RESOURCES MAY YOU USE?



- *Production Technology*. Stanley A. Komacek, 1993.
- *Technology Shaping Our World*. John Gradwell, 1993.
- *Design and Technology*. Colin Caborn, et. al., 1989.



# ACTIVITIES/WORKSHEETS

## 1. Technological System

1.1 People create technological systems to help solve problems. A system often includes these parts: input, process output and feedback. Select a simple household item and identify what:

- input information and resources were required to make the product
- processes were used to manufacture the product
- were the intended and unintended outcomes
- feedback the manufacturer might need to know to improve the product and the production process

1.2 Explain the difference between an open and a closed technological system.

## 2. Properties of Materials

2.1 Designers and builders make choices about what materials they are going to use based on availability of the material, its cost and properties. Identify the cost and availability of five materials commonly used in building structures and products

2.2 Properties of materials tell how a material can be expected to perform during and after construction/fabrication. Identify a simple test that can be used to determine:

- a mechanical property
- a material's reaction to heat
- how chemicals affect the material
- its optical qualities
- its electrical and magnetic properties.

## 3. Tool and Equipment Identification

As you work with technology, you will need to select the correct hand and power tools, and use these tools in a safe manner.

3.1 Identify and describe the use of two or more tools that can be used safely to:

- measure
- mark a surface
- cut through a material
- smooth a material
- form a material
- hold a material
- install a fastener
- apply a finish.



**4. Construction and Fabrication Process****4.1 Complete the following activities in consultation with your teacher:**

- Choose a simple artifact or structure that can be made from common building materials
- Locate a set of plans and a set of procedures that will help you build the product
- Identify and locate the appropriate materials and tools that are required to make the project.

**4.2 The purpose of this activity is to design and build a matching set of structures. One structure will be built using Imperial measurements and the other using SI units of measurement. When you are finished constructing these structures you will be asked the following questions:**

- Which system of measurement was easier to use?
- Which system achieved the greatest accuracy?
- What design features did you build into your plan to add strength to your structure?

Structures to consider constructing are a set of:

- book ends
- shelf brackets
- “c” clamps.

**Evaluation**

Your marks for these activities will be based on:

- how well you plan and manage your project
- the work skills you develop and apply
- your project work
- presentation of your project



# CAREER & TECHNOLOGY STUDIES

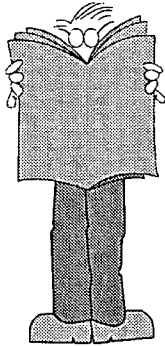
## CONSTRUCTION TECHNOLOGIES

### SAMPLE STUDENT LEARNING GUIDE

#### CON2010 Site Preparation



# WHY TAKE THIS MODULE?



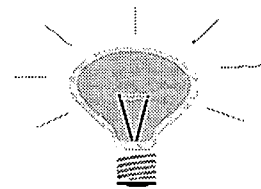
Extra care and attention must be given to the proper location and excavation of a building site. By taking this module you will be able to:

- interpret a site plan
- prepare an application for a building permit
- survey a building site
- prepare a site for construction.

# WHAT DO YOU NEED TO KNOW BEFORE YOU START?

**Prerequisite:** CON1070: Building Construction

In addition, to successfully complete this module you will need print reading skills, a knowledge of geometry, and be able to measure and calculate accurately.





# WHAT

**WILL YOU KNOW AND  
BE ABLE TO DO  
WHEN YOU FINISH?**

Upon completion of this module you will be able to:

- identify and describe typical building site layout and excavation processes
- complete an application for a building permit
- apply site preparation skills to assist in the location of building site lines and features
- demonstrate basic competencies.

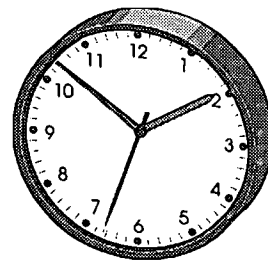
# WHEN

**SHOULD YOUR WORK BE DONE?**

Your teacher will give you a timeline for completing tasks and assignments within this module.

You may also wish to use a time-management planning chart to preplan the work that needs to be done in this module. Plan how you will use your class time as well as extra time needed to complete the assignments in this module.

Review the work to be completed in this module and allocate your time accordingly.





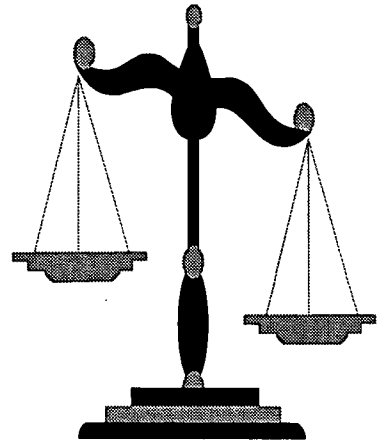
## CONSTRUCTION TECHNOLOGIES

### CON2010 Site Preparation

# HOW

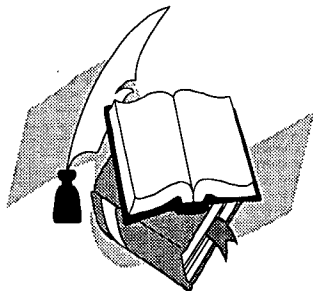
## WILL YOUR MARK FOR THIS MODULE BE DETERMINED?

	PERCENTAGE
<p>You must first demonstrate <b>all</b> of the competencies required for this module.</p> <p>When you have done this, your percentage mark for the module will be determined as follows:</p> <ul style="list-style-type: none"><li>• Research on-site layout and excavation procedures (Preparing a Building Site, CON2010-1)</li><li>• Preparation of a building permit</li><li>• Building site layout activities (Building Site Layout, CON2010-2)</li></ul>	<p>15%</p> <p>15%</p> <p>60%</p> <p>10%</p>



# WHICH

## RESOURCES MAY YOU USE?



- *Building Construction Technology*. Kenneth F. Cannon, 1982.
- *Modern Carpentry*. Willis H. Wagner, et. al, 1996.
- *Alberta Building Code*. Alberta Government.
- *Illustrated Residential and Commercial Construction*. Peter A. Mann, 1989.



# ACTIVITIES/WORKSHEETS

## 1. Prepare a Building Permit

### 1.1 Before starting construction, a sample building permit must be obtained:

- Explain the purpose of building permit
- List the information that is required to complete an application for a permit

### 1.2 Given a set of drawings, prepare an application for a building permit in your locality

### 1.3 Once a permit has been given, identify the types and number of inspections that must be carried out as the construction progresses.

## 2. Site Survey

A typical site plan shows the location of a building on a lot. It is the responsibility of the surveyor to relate the existing features of the lot. The finished elevation and other features are the responsibility of the architect or designer.

### 2.1 Given a site plan, assist in the:

- measurement and location of lot boundaries
- location of all setbacks
- setting out of the exact location of the building
- location of the batterboards

### 2.2 Determine the amount of soil that is to be excavated from the building site.

## 3. Site Preparation

### 3.1 A builder's level or transit is often used to level a building site:

- identify the parts of a builder's level
- describe the procedure used to level a site

### 3.2 It is important that building features are level and square to one another:

- describe a system of laying out right angles and checking for overall squareness
- check the level and location of all survey stakes.



# CAREER & TECHNOLOGY STUDIES

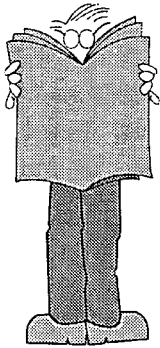
## CONSTRUCTION TECHNOLOGIES

### SAMPLE STUDENT LEARNING GUIDE

#### **CON3040 Stair Construction**



# WHY TAKE THIS MODULE?



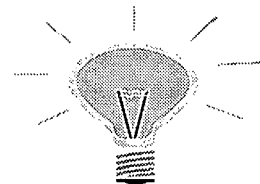
Constructing a set of stairs seems difficult but with a little study and work it can be easily accomplished. By taking this module, you will be able to:

- build and gain confidence in your carpentry skills
- use mathematics to help solve a construction problem
- acquire a skill that can be used in daily living or in the workplace.

# WHAT DO YOU NEED TO KNOW BEFORE YOU START?

**Prerequisite:** CON1070: Building Construction

In addition, to be successful in this module you will need to understand basic geometry, layout procedures and demonstrate the safe use of hand and power tools.





# WHAT

**WILL YOU KNOW AND  
BE ABLE TO DO  
WHEN YOU FINISH?**

Upon completion of this module you will be able to:

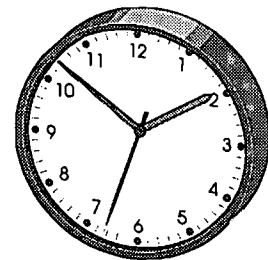
- identify and describe different stair types, component parts and construction techniques
- interpret building code regulations pertaining to residential stair design
- design, lay out and construct a straight flight of stairs
- demonstrate basic competencies.

# WHEN

**SHOULD YOUR WORK BE DONE?**

Your teacher will give you a timeline for completing tasks and assignments within this module.

You may also wish to use a time-management planning chart to preplan the work that needs to be done in this module. Plan how you will use your class time as well as extra time needed to complete the assignments in this module.





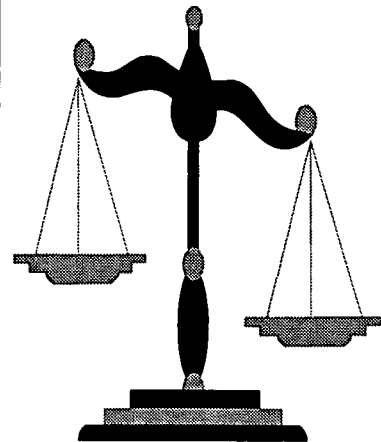
## CONSTRUCTION TECHNOLOGIES

### CON3040 Stair Construction

# HOW

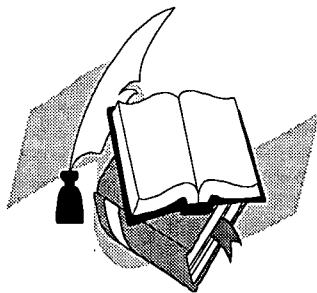
## WILL YOUR MARK FOR THIS MODULE BE DETERMINED?

	PERCENTAGE
<p>You must first demonstrate <b>all</b> of the competencies required for this module.</p> <p>When you have done this, your percentage mark for the module will be determined as follows:</p> <ul style="list-style-type: none"><li>• Research on stair types and construction techniques (Stair Construction, CON3040-1)</li><li>• Interpretation of building codes and stair design</li><li>• Practical activities (Activity Assessment, CON3040-2)</li></ul>	<p>15%</p> <p>15%</p> <p>70%</p>



# WHICH

## RESOURCES MAY YOU USE?



- *Building Construction Technology*. Kenneth F. Cannon, 1982.
- *Modern Carpentry*. Willis H. Wagner, et. al., 1996.
- *Alberta Building Code*. Alberta Government.
- *Illustrated Residential and Commercial Construction*. Peter Mann, 1989.



# ACTIVITIES/WORKSHEETS

## 1. Stair Design

The basic function of a set of stairs is to provide access to different floors or surface levels. Some stairs, like a set of basement stairs, are designed for function only, while others in living areas are used to add style and character to the space.

- 1.1 Identify and describe the types of stairs that are commonly used in residential construction.
- 1.2 Explain the difference between a housed stringer and a carriage stringer, and identify the advantages and disadvantages of each type of stringer.
- 1.3 In relation to these basic types of stringers, explain how the vertical spaces between treads can be filled in and nosing features added.

## 2. Stair Code

2.1 Name the parts of a typical straight flight stair layout and identify, according to local code requirements, the:

- appropriate stair angle, tread run and rise for a given application
- minimum stairwell opening and headroom

2.2 Identify the parts of typical balustrade and the codes related to their construction.

## 3. Stair Design and Construction

Use the following specification to design and build a model set of stairs

Total Rise:	340 mm
Total Run:	360 mm
Stair Width	400 mm
Tread & Stringer Thickness	15 mm
Riser Thickness	12 mm
Nosing	15 mm

3.1 Having the riser as close to 80 mm as possible, calculate:

- The number of risers @ mm
- The number of runs @ mm

3.2 Using a 1:2 scale, draw an orthographic projection of the calculated stairs, showing dimensions and labeling all parts

3.3 Do a material and cost estimate for the model stairs

3.4 Submit your calculation, drawings and estimate to your teacher

3.5 Construct the model according to your project plan.



## **CONSTRUCTION TECHNOLOGIES**

### **CON3040 Stair Construction**

#### Evaluation Criteria

- Planning and management skills
- Construction techniques
- Use of equipment and materials
- Teamwork



## K. ACKNOWLEDGEMENTS

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Robert Baker	Program Consultant, Construction Technologies, Career and Technology Studies (1993-1997)

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